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THE SECOND ECONOMY IN
DISEQUILIBRIUM AND SHORTAGE MODELS
OF CENTRALLY PLANNED ECONOMIES

Christopher M. Davis

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The Second Economy in Disequilibrium and Shortage Models
of Centrally Planned Economies

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4 August 1988

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I. Introduction

Legal and illegal private activities have been carried out continuously, but with varying degrees of intensity, in all centrally planned economies (CPEs). In the case of the Soviet Union evidence exists of second economy operations during the periods of War Communism, the New Economic Policy (NEP), the 1930s, World War II, late Stalinism, the Khrushchev regime, and Brezhnev's rule. There is substantial documentation of widespread black market transactions, private initiative, and corruption in Eastern Europe, the People's Republic of China, and socialist Vietnam. In the CPEs the second economy plays a significant role and influences individual and institutional behavior as well as important quantity and monetized economic processes.

One major reason for the tenacious survival, and occasional flourishing, of the second economy system in socialist countries is that throughout their histories the CPEs have been afflicted by disequilibrium in official markets, usually of an excess demand variety, and chronic shortages of goods and services. These are the results of inconsistencies between the preferences of the leaders and the population, policy decisions, inaccurate planning, rigidity of the price adjustment mechanism in the state (first) economy, unanticipated developments, and the imperfectly controlled behavior of subordinate institutions, such as households and firms. The pervasive disequilibria and shortages have generated demands in private markets for deficit commodities. The second economy is motivated to supply desired goods and services by substantial rewards in cash and kind. It is able to

produce and distribute commodities because of slack social control, corruption and widespread theft of materials, capital equipment, and labor time. This siphoning of resources by the second economy in turn aggravates shortages in official retail and producer goods markets.

Until recently models of CPEs in East and West ignored or minimized the importance of both the second economy and shortage/disequilibrium phenomena. In the socialist countries this neglect was caused by Utopian ideological visions, state censorship, deficiencies in indigenous critical empirical analysis, and the monopoly position of equilibrium-oriented models, such as material balances, input-output, and optimal planning. Some Western empirical analysts of CPEs did pay attention to issues of disequilibrium, shortage, and the second economy. However, most economists did not because of the incompatibility of these real phenomena with existing theories and models and the absence of data that would permit sophisticated quantitative analysis.

Over the past decade the modelling and analysis of CPEs have significantly advanced. Of particular note have been the studies based upon disequilibrium (or constrained equilibrium) models, such as the macroeconomic econometric ones pioneered by Richard Portes, and the shortage models of Janos Kornai and his followers (Davis and Chareaza (forthcoming (b))). As their names suggest, these models are focused on the portrayal and investigation of disequilibrium phenomena. The primary objectives of this paper are to determine whether these new models have in fact advanced research on the second economy and to assess their potential as analytical tools.

The characteristics and contributions of a diverse set of models can be analyzed in various ways. One could evaluate them rigorously relative to pre-selected theoretical standards. Alternatively, one could produce abstracts of the models and then engage in ex post comparison. The approach adopted in this paper represents a third, intermediate option that is derived from one employed by Stone (1970a) in his survey of educational planning models. It involves the definition of the system of second economy transactors and activities in a manner compatible with national accounts methodology and the evaluation of the models' coverage of this system. The selection of this approach reflects the fact that the theory of the second economy in CPGs requires further development and that disequilibrium and shortage models are derived from quite different theoretical foundations, so evaluating one according to standards of the other would produce a biased result.

The analysis begins in Part II by defining the second economy system of a CPG in terms of transactors, markets, and activities. This generates diagrams of quantity and financial flows between transactors involved in the second economy that provide the framework for the subsequent examination of the specific disequilibrium and shortage models. Readers more interested in the models than in institutional details of the second economy should confine their attention to the summary of Part II provided in Section D.

The development of disequilibrium and shortage models of CPGs is surveyed in Part III. Its three sections review: the historical inter-relationship between disequilibrium, shortage, and the second economy.

the foundations of disequilibrium and shortage models provided by theoretical and empirical research during 1945-86; and the main features of the new models that focus on the analysis of shortage and disequilibrium phenomena in CPGs.

Part IV is devoted to the evaluation of the treatment of the second economy in disequilibrium models. The topics covered are: equilibrium models with a second economy; the initial Portes macro-economic disequilibrium econometric models and the second economy; microeconomic disequilibrium econometric models with a private sector; and Charanra's recent disequilibrium model of the consumption sphere of a CPG that incorporates second economy transactions. This is followed in Part V by an equivalent examination of the shortage model. Kornai's contributions are reviewed and suggestions are presented concerning the application of the shortage model to second economy analysis. Finally, Part VI presents the conclusions from this study about the success of disequilibrium and shortage models in describing and analyzing the second economy in CPGs.

It should be noted that this paper is intended to be a wide-ranging survey based on the systems approach mentioned above, rather than a compilation of abstracts. As a result, the presentations of models are incomplete, some significant topics are neglected, and important results are summarized. For example, minimal attention is devoted to technical issues of model specification, parameter estimation and hypothesis testing. Interested readers should consult the original models or other related studies for additional information. Furthermore, since the focus is on disequilibrium and shortage models no

effort is made to review the extensive second economy literature listed in Grossman (1985, 1987) bibliographies.

is summarized in Section D. As indicated in the introduction, readers primarily interested in these models should read only this summary.

II. The Second Economy in the Centrally Planned Economy: A System

Description

The second economy in a CPE is a system comprised of a diverse set of transactors that engage in a variety of private activities and are interconnected through transactions conducted in numerous markets. The different models of disequilibrium and shortage examine various aspects of the second economy. In order to assess their coverage and to compare their treatment of issues it is necessary to have a definition of the second economy that can be used as a common standard. The objective of Part II is to establish a comprehensive systems definition of the second economy that is compatible with national accounts methodology.

Section A reviews previous definitions of the second economy, presents a systems-oriented one, and discusses the national accounts methodology of systems description. Section B identifies the ten transactors that are involved in the second economy and outlines their input, production, and output activities. The interconnections of these transactors through markets and the quantity and financial flows of the second economy are described in Section C. The systems definition of the second economy in a CPE that serves as a framework for the subsequent comparative assessment of disequilibrium and shortage models

A. Definitions of the Second Economy

There are numerous and varied definitions of the second economy in the CPE. Grossman (1977, pg. 25) defines it broadly as follows:

... the second economy comprises all production and exchange activity that fulfills at least one of the two following tests:
(a) being directly for private gain; (b) being in some significant respect in knowing contravention of existing law'.

In contrast, Katzenellenbogen (1977) defines the second economy by type of market and codes them with colors related to degree of legality. O'Hearn (1980, pg. 218) asserts that 'the second economy should be defined in terms of its contraposition to the plan'. Galasi (1985, pg. 355) argues that a structural definition is needed. He divides the economy in two and claims that:

'The second economy, on the other hand, is not directed but regulated by the state; the units here use their own means of production. Consequently, they have compulsory budget constraints; they survive only if they are profitable. There is no compulsory operation in this sector; its units can start or stop their activities at any time'.

These definitions provide a foundation for the more detailed systems-oriented one that is developed in this paper. Grossman's recommendation that both legal and illegal private activities be included in the second economy is accepted with some reservations concerning the inclusion of legal private transactions. It is

questionable, for example, whether in a socialist economy without illegal activities (a condition not yet encountered in history) the contra-distinction of first and second economies would be made rather than state and private. In any event, the focus of this investigation is on illegal aspects of the second economy. The concept of the second economy market is employed, although the markets identified are somewhat different from those discussed by Ketsue, elbinholzen. Use is made as well of the propositions that second economy activities are outside the official plan and that some units involved have unique characteristics such as hard budget constraints. However, it needs to be recognized that state enterprises with soft budget constraints play important roles in the second economy, as do government organizations that are normally treated as 'non-economic', such as political authorities and control agencies (e.g. police).

The definition of the second economy in this paper was further influenced by the systems analysis methodology employed by Stone (1970a) in his survey of mathematical models in educational planning. He argues that in order to assess models it is helpful to relate them to the systems they are supposed to portray and to the stages of system analysis. The first stage is to isolate and define the system, which is an assemblage of objects united by some form of regular interaction or interdependence. If one interprets the second economy as a system and takes into account the characteristics noted above then the following definition can be developed: the second economy is a system comprised of all transactors and markets involved in activities of production and exchange which have the characteristics of being for private gain and/or

illegal.

The other stages of systems analysis outlined by Stone are: description of the system's institutions, activities, and variables; theoretical formulation of models that connect variables; collection of relevant data; estimation of parameters in relationships; assessment of the success of the system in achieving its aims; and development of policies to help regulate the system. The remainder of Part II is devoted to the task of describing in detail the second economy system in a CPE. In Parts IV and V evaluations are made of the contributions of disequilibrium and shortage models to the other stages of analysis of the second economy system.

There are several methods that can be employed to describe economic systems. The choice should be determined by the purposes of the particular study. Since this paper is using the second economy system description as a framework for evaluating economic models it becomes appropriate to make the descriptive approach as consistent as possible with national accounting concepts, which provide the foundation for economic modelling. Given the fact that the second economy is only a component of a CPE, however, attention is focused on disaggregated representation. No attempt is made to relate the second economy system to national level accounts.¹

A national accounts description of an economic system involves several steps. First, one must identify the economic agents, or

¹ The selection of a national accounts approach to the description of the second economy system should help to relate this study to the research being carried out independently by Vladimir Treml on the second economy in the Soviet national accounts. However, his work was not examined while preparing this discussion paper, so there may not be close correspondences of definitions and system descriptions.

1. **Industries**, such as households and industrial firms (Kendrick (1972, Chapter 1), United Nations (1968, Chapter VII). Second, transactors should be grouped in accordance with activity or purpose, preferably in a manner that relates to identifiable institutions or standard statistical units. The major categories of transactors of relevance to this are households, industries, and producers of government services (United Nations (1968, Chapter VII).² Their respective dominant activities are consumption of final goods and services, production of goods and services for sale in markets at prices that normally cover costs, and production of goods and services that are primarily non-marketable and financed by the state budget. Naturally, the categories can be further subdivided according to industrial or institutional classifications based on economic activity or purposes of government (United Nations (1968, Chapter VII). Third, stock flow descriptions should be made of the activities and transactions of agents in the areas of production, consumption, income and outlay, capital formation, and capital finance. Fourth, the transactions should be related to the four basic accounts of the nation concerning production, consumption, accumulation, and foreign exchange and to national balance sheets (Stone (1968, pg. 164)).

The accounts of an economic system can be presented using five different but compatible methods: diagrams, transaction accounts and

² In a market economy the list of transactors would include producers of private non profit services for households and domestic services considered by households. Furthermore, the United Nations (1968, Chapter V) recommends somewhat different categorizations of transactors for the production, consumption expenditure, and capital formation accounts than for the income and outlay and capital finance accounts.

balances, balance statements, matrices, and equations (United Nations (1968, Chapter VI), Kendrick (1972, Chapter I)). A diagrammatic presentation is appropriate when the purpose is to make a simplified introduction to a complex system, as is the case in this paper. Accordingly, the remainder of Part II identifies the transactors in the second economy and presents diagrams of the quantity and financial flows between them. Past work by Stone (1961) and this author (Davis (1979)) has shown that it is straightforward to move from flow diagrams to mathematical descriptions of systems using matrices and equations.³

B. Transactions in the Second Economy System

In order to accomplish the first task of system description, identification of transactors, a review was made of the literature on second economies in CPEs. This revealed that transactors could be found in three national accounts categories: households, industries, and government producers of services. Several distinct agents are included in each of the latter two groupings, as indicated below.

Industries can be defined as establishments or institutions that engage in the activity of production of commodities (e.g. goods and services) (Stone (1961)).

J. Stone (1961) makes use of diagrams to clarify the structure and dynamics of three mathematical models that relate the allocations of labor supply with the demand for commodities simultaneously determine the supply of labor and the demand for leisure, and depict the interdependent and economic processes in the health service. The Ph.D. dissertation of Davis (1979), which was prepared under the supervision of Professor Richard Stone, uses methods developed by Stone to discuss and mathematically model the relationships between the population, illness pattern, demand for medical care, health service activities, and the economy in the USA.

services that are sold in markets at prices that normally cover production costs (United Nations (1968, pg. 72)). The industries that participate in the second economy of a CPG can be subdivided into five categories by taking into account characteristics such as legal nature, integration in planning system, responsiveness to market forces, technologies, commodities produced, and cost structures. These are: first economy producers of consumer commodities (PC); legal private producers of consumer commodities (LC); illegal producers of consumer commodities (SC); first economy producers of producer commodities (FP); and illegal producers of producer commodities (SP).

Two points of amplification concerning industrial categories should be made at this stage. First, in the second economy system there is not necessarily a strict correspondence between transactors and institutions. Transactors in the category PC can always be identified with state enterprises or farms. In contrast, illegal producers SC and SP can be located in either independent units or concealed within state enterprises. Second, each of the five second economy industrial groupings can be further subdivided to take into account specific production and exchange activities. If one were to portray exchanges between transactors using a transaction matrix, then each of the five industry rows and columns could be disaggregated into n rows and columns, thereby transforming initial 1 x 1 dimension cells into n x n sub-matrices (in the same manner that the commodities and industries cells within the production account can be elaborated as input-output tables (United Nations (1968, Chapter III))).

The third general category of second economy transactor is producer of government services. It is defined in United Nations (1968, pp. 74-75) as follows:

'The producers of government services furnish, but normally do not sell, to the community those common services which cannot otherwise be conveniently and economically provided, and administer the State and the economic and social policy of the community. Their activities therefore differ substantially in character, cost structure and source of finance from the activities of industries.'

Producers of government services are predominantly financed by the state budget and include all departments, ministries, establishments, and bodies of the types listed in Table 5.3 of the purposes classification of United Nations (1968, pp. 87-88).

One can find evidence that most types of government producers of services in CPGs are involved in illegal transactions in the second economy (see for example Staats (1972), Sisala (1977), Franklin (1981), Grossman (1982)). For analytical purposes, however, this paper allocates most government service producers to the categories PC (first economy producers of consumer commodities) and FP (first economy producers of producer commodities). It isolates for special attention institutions in the categories of general administration, public order and safety, and economic regulation. More specifically, the following four government transactors in the second economy are examined: political authorities (PA); control agencies (CA); central economic authorities (CE); and central supply agencies (CS).

The ten transactors that are identified above comprise the basic units of the second economy system in a CPG. They all engage in the activities of consumption of inputs of labor, capital and intermediate

sounds, production of goods and services, and provision of goods and services to other transactors through a variety of markets (e.g. retail and producer goods markets; labor markets, financial and barter markets).⁴ In the cases of illegal producers of consumer and producer commodities (SC and SP) all transactions are illegal in character and activities are financed by sales in markets. The other eight transactors are involved in both legal and illegal activities that are supported by market sales and the state budget. The output and input characteristics of the second economy transactors are summarized in table 1 and described in more detail in the following sub-sections.

i. Households (Ho)
 The household is an important transactor in the socialist second economy.⁵ If one accepts household production theory (see footnote 3), then it can be viewed as an institution that engages in the production of basic commodities (e.g. health) to enhance its utility using inputs of its own labor time and goods and services acquired in official, legal private, and illegal retail markets. The household provides labor services to the other nine transactors of the economy as well as capital finance to legal and illegal private producers. Its disposable income is the sum of wages plus net transfers (social benefits minus taxes) plus legal and illegal property income. In a given period

⁴ One can interpret the activities of households in a manner similar to that of industrial enterprises using household production theory, which is summarized in Beaton and Maelzer (1980, Chapter 10).

⁵ Discussions of the role of the household in the second economy can be found in Siemers (1975), Katsenelenbaum (1977), Grossman (1977, 1979), O'Hearn (1980) and Gabor and Galas (1981).

Table 1: Transactors in the Socialist Second Economy

Type of Transactor	Legal Output	Illegal Output
Households (Ho)	Labor services to SC official transactors and SP	Labor services to SC
First Economy Producers of Consumer Commodities (PC)	Consumer goods and services for sale in official retail markets	Consumer goods and services to SC; bribes
Legal Private Producers of Consumer Commodities (LC)	Consumer goods and services for sale regulated private markets	Consumer goods and services to SC; bribes
Illegal Producers of Consumer Commodities (SC)	None	Consumer goods and services for sale in illegal retail markets
First Economy Producers of Producer Commodities (FP)	Producer goods and services for PC, LC and government agencies	Producer goods and services for SP and SC; bribes
Illegal Producers of Producer Commodities (SP)	None	Producer goods and services for FP, PC LC, SC; bribes
Political Authorities (PA)	Administrative services for regulation of the economy and society	Protection services to subordinate agencies involved in illegal activities
Control Agencies (CA)	Control services to ensure legal operations of transactors	Protection services to lower level second economy operatives; bribes
Central Economic Authorities (CE)	Plans and budgets for the official transactors; monetary control and banking	Fiscal plans and padded budgets to mask second economy operations; bribes
Central Supply Agencies (CS)	Allocations of domestic and foreign supplies to official transactors	Unofficial allocations of supplies to second economy transactors;

household expenditure potential is determined by current disposable income plus saving from past periods.

Table 1: Transactors in the Socialist Second Economy

Type of Transactor	Legal Inputs	Illegal Inputs
Households (HU)	Commodities from official and legal private retail markets and bribes	Commodities from illegal retail, barter and bribes markets
First Economy Producers of Consumer Commodities (FC)	Labor, capital and intermediate goods (LCIG)	Goods and services from SP; bribes; false plans from CR; unofficial supplies from CS
Legal Private Producers of Consumer Commodities (LC)	(LCIG)	Goods and services from SP, unofficial supplies from CS
Illegal Producers of Consumer Commodities (SC)	None	Goods and services from LC, PC, PP, SP; labor; unofficial supplies from CS
First Economy Producers of Producer Commodities (PP)	(LCIG)	Goods and services from SP; bribes; false plans from CR; unofficial supplies from CS
Illegal Producers of Producer Commodities (SP)	None	Goods and services from PP; labor; unofficial supplies from CS
Political Authorities (PA)	(LCIG)	Bribes
Control Agencies (CA)	(LCIG)	Bribes
Central Economic Authorities (CEA)	(LCIG)	Bribes
Central Supply Agencies (CSA)	(LCIG)	Bribes

2. First Economy Producers of Consumer Commodities (FC)	
	This category of industry transactor contains state organizations that produce and distribute consumer goods and services: consumer industry enterprises; farms (state and collective); firms engaged in provision of personal services (e.g. hairdressers); government producers of communal services (e.g. hospitals); and retail trade establishments.
	Officially, all output should be distributed through state controlled retail markets. However, some of the goods and services produced are diverted to the second economy through the transactor SC (illegal producers of consumer commodities), such as: finished industrial consumer goods; medical and educational services; personal services, such as haircuts; food products; and housing services. This generates substantial additional income for the participants in FC. Part of this is spent on the bribes going to CS (central supply agencies). CS (central economic authorities) and CA (control agencies) for favors or protection. On the input side the FC makes use of legally acquired supplies of labor, capital, and intermediate goods. In addition, it pays for the services of tolkuchi and shabashniki and for illegal supplies of industrial goods and services provided by SP (illegal producers of producer commodities). ⁶

6 Descriptions of the second economy activities of first economy producers of consumer commodities can be found in Sime (1975), Grossman (1977, 1979, 1982), Powell (1977), Sime (1977, 1982), Miles (1982), and Kroncher (1982).

3. Legal Private Producers of Consumer Commodities (LC)

A third transactor in the second economy is the legal private producer of consumer commodities.⁷ Even in a traditional CPE certain types of private economic activity are allowed, such as: food production on private plots; sale of agricultural goods in collective farm markets; re-sale of personal items; hunting and prospecting; individual provision of some personal services; and co-operative production of various types of goods and services. The individuals and institutions involved in legal private production can be combined into the transactor LC. Their productive activities are not subject to central plans, but are monitored by CA (control agencies). All output is supposed to be sold in regulated legal private retail markets. But some of the goods and services are diverted through SC (illegal producers of consumer commodities) for sale in the illegal retail market or used to pay bribes in kind for protection to control agencies. The LC in the traditional CPE rarely is officially authorized to acquire adequate commodity or labor inputs from FP (first economy producers of producer commodities) by planners and central supply agencies.⁸ As a result, it must

illegally obtain supplemental inputs from SP (illegal producers of producer commodities).

4. Illegal Producers of Consumer Commodities (SC)

This second economy transactor includes all individuals and organizations that produce consumer goods and services in special facilities (e.g. an unofficial, independent factory) or on the side in state facilities and that distribute illegally produced or acquired consumer commodities.⁹ Its output is sold in the illegal retail market, which is an aggregation of the various semi-legal and illegal markets discussed by Katesenlinboigen (1977), O'Hearn (1980) and others. Since the SC is not part of the first economy it is not governed by plans nor does it receive any official allocation of inputs. Instead it purchases necessary supplies in a covert manner. Labor services are obtained from people who are officially economically inactive (such as the elderly), work in the first economy (who in effect steal time), and work after hours (moonlighters). The SC acquires legally produced finished consumer goods for re-sale in illegal retail markets from LC (legal private producers of consumer commodities) and FC (first economy producers of consumer commodities). Inputs of capital and intermediate goods are obtained illegally from either illegal or first economy producers of producer goods (SP or FP). If, however, the high-level authorities have been corrupted, say in republics such as Uzbekistan or Georgia, then the SC may be directly.

⁷ The activities of legal private producers of consumer commodities (LC) are discussed in Simes (1975), Grossman (1977, 1979), Aslund (1984), and Brezinski (1985). It should be noted that in reality it is difficult to make an institutional differentiation of LC from related illegal producers and distributors because legal and illegal activities are carried out by the same individual establishment. Use of the concept of transactor to some extent circumvents this problem.

⁸ Legal private producers in reformed or reforming CPEs, such as Hungary, Poland or the USSR, are given greater rights to employ labor and to obtain official supplies of capital and intermediate goods.

⁹ Information about illegal producers of consumer commodities is provided in Simes (1975), Katesenlinboigen (1977), Grossman (1977, 1979, 1982), Wiles (1982), Wiles (1982), Kroncher (1982), and Brezinski (1985).

but officially allocated commodities by the central supply agencies (CS). Significant shares of SC output and income are devoted to paying briutes to CA, control agencies (CA) and central economic authorities (CE).

5. First economy producers of producer commodities (PP)

The three producers of consumer commodities discussed above (FC, LC and SC) require inputs of capital and intermediate commodities. These are primarily acquired from the fifth type of transactor in the second economy, called first economy producers of producer commodities (PP). Transactors in this category can be identified with official factories and farms engaged in the production of producer goods and services as well as lower level supply and trade organizations that distribute them.

According to official plans their output should be used by PP itself or provided to first economy and legal private producers of consumer commodities (FC and LC), to central supply agencies (CS) for export, or to government organizations (PA, CA, CS, CE) to support production of their services. In reality it also diverts officially produced goods to illegal producers of consumer and producer commodities (SC and SP) and legal producers of consumer commodities (LC) in return for illegal payments of goods, services, and cash.

The PP receives legal inputs of labour, capital, and intermediate goods that are governed by state plans and budgets. However, even a firm exclusively devoted to producing and distributing official output may need to obtain illegally intermediate goods and capital repair services in short supply from illegal producers of producer commodities (SP). These second economy input transactions are conducted on both barter and cash bases. If the central authorities have been corrupted then a firm consciously engaged in production for the second economy may be able to purchase false plans from central economic authorities (CE), unofficial allocations of goods from central supply agencies (CS), and protection from control agencies (CA).

b. Illegal Producers of Producer Commodities (SP)

A sixth category of second economy transactor is that of illegal producers of producer commodities (SP).¹¹ This transactor is distinct from PP (first economy producers of producer commodities) in that the latter is identifiable with official institutions (e.g. state industrial firms) and produces goods for the second economy at officially recognized production facilities, whereas SP engages in production either in a separate, totally illegal firm or in specially designated shadow sub-units of state enterprises.

The output of SP is consumed by the enterprise itself or sold in the illegal producer goods markets to both the legal transactors PP (first economy producer of producer commodities), FC (first economy production and exchange activities of the official socialist firm). Other informative sources are Berliner (1952, 1957), Statis (1972), Niles (1975), Sims (1977), Powell (1977), Kranzler (1982), and Wiles (1982). Katesen (1977), Wiles (1982), and Kranzler (1982).

¹¹ Grossman (1982) provides an excellent analysis of the second economy production and exchange activities of the official socialist firm. Other informative sources are Berliner (1952, 1957), Statis (1972), Niles (1975), Sims (1977), Powell (1977), Kranzler (1982), and Wiles (1982).

producer of consumer commodities), and LC (legal private producer of consumer commodities) as well as to illegal producers of consumer commodities (SC). Transactions are carried out in cash and kind. Labor inputs are purchased from pensioners, individuals who steal time from the first economy, and moonlighters. Most capital and intermediate commodities are illegally acquired either directly from SP or from traders in producer goods within SP. Capital finance to support SP operations is obtained from households (HO). If the central authorities have been corrupted, then it is possible for SP to purchase allocations of commodities from the central supply agencies (CS) and protection services from the control agencies (CA) to ensure the maintenance of acceptable operating conditions.

7. Political Authorities (PA)

This government transactor in the second economy of a CPB corresponds to United Nations (1968, Table 5.3) classification 1.1 'General Administration' and is comprised of leading Communist Party and parliamentary (e.g. Soviet) organizations at city, regional, republican, and national level. These institutions establish the legal framework for the economy, national objectives, and priorities and give general directives concerning management of the economy to subordinate government transactors CR (central economic authorities), CS (central supply agencies), and CA (control agencies).

There is substantial evidence of pervasive corruption of members of the political elite or entire leading institutions of socialist countries at all levels, including the Politburo of the USSR (e.g. the

previous First Secretaries of Georgia, Mzhavanadze, and of Uzbekistan, Rashidov) and the Supreme Soviet (e.g. ex-Chairman of the Council of Nationalities, Nasreddinova). In return for substantial bribes in cash and kind the corrupted political authorities provide protection services to elements of CR, CS, and CA that are involved more directly in second economy activities.¹²

8. Control Agencies (CA)

All socialist economies maintain institutions that produce regulatory and control services which are intended to ensure that economic organizations perform in accordance with existing laws, plans, and policies.¹³ These include the militia, secret police, economic police (e.g. OBISS in the USSR), prosecutors, and party or state inspectors of various kinds. Together they comprise the eighth type of transactor in the second economy of a CPB.

Over time the attitudes of the political authorities (PA) to the second economy can vary from repressive to tolerant. The control agencies are supposed to tighten or loosen restrictions on law-level private activities in accordance with high-level directives and to prevent bribery of central government organizations. However, evidence

12 The corruption and second economy activities of political authorities in CPBs are discussed in Staats (1972), Simes (1975), Grossman (1977, 1979), Simes (1977, 1982), Schwartz (1979), Montias and Rose Ackerman (1981), Jowitt (1983), and Lampert (1984).

13 The control institutions correspond to national accounts transactors defined in United Nations (1968, Table 5.3) in the classes: 1.1 General Administration, 1.3 Public Order and Safety, and 8.1 General Administration, Regulation and Research.

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from the USSR and elsewhere indicates that virtually all components of the CA can become corrupted up to the highest level.¹⁴ A corrupted CA provides protection services to government, state and private transactors in return for bribes. The CA protects its clients by ignoring violations of law and regulations, intimidating public spirited whistle-blowers, diverting investigations, and sabotaging prosecutions. A share of CA's bribes income is re-distributed as payments for the protection services of superior political authorities (PA).

9. Central Economic Authorities (CEA)

Another transactor in the socialist second economy is made up of central economic authorities (cases 1.1 and 8.1 in Table 5.3 of United Nations (1988, pp. 87-89)). CG institutions produce services that direct and regulate the economy at regional, republican, and national level (besides those governing supplies). They include the State Planning Committee (Gosplan), the Council of Ministers, branch ministries, the Ministry of Finance, and the State Bank. For example, Gosplan converts the directives of political authorities (PA) into concrete plans that govern the operations of the legal transactors in the economy. These are supported by the state budget and central monetary policy.

14. Detailed discussions of several ex-mony related corruption among police, economic police, procurators, and inspectors in CKA can be found in Siles (1975), Grossman (1977, 1979), Simla (1977, 1982), Wiles (1982), Aslund (1984), and expert (1984). The official Soviet press now acknowledges that the Ministry of Internal Affairs was riddled by corruption during the Brezhnev regime.

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In addition to carrying out its official duties the CG engages in a variety of activities in support of the second economy which can be categorized as false planning. These include accepting falsified reports on plan fulfilment (e.g. about cotton output in Uzbekistan), budget expenditure, or production capacity and by issuing plans and budgets designed to facilitate illegal production. The economic authorities receive bribes as payment for these false planning services and re-distribute a share to the political authorities (PA) and control agencies (CA) in return for protection. The CG can stimulate second economy activity inadvertently by exercising slack control of the money supply. This occurs when it allows households to receive wage and transfer payments and firms to receive budget funds that are excessive relative to supplies of goods and services in official retail and producer goods markets.

10. Central Supply Agencies (CSA)

The final transactor is comprised of the central supply agencies (e.g. Gosnab, Ministry of Foreign Trade). They control inventories of centrally distributed domestic and foreign commodities and issue authorizations for acquisition of supplies to legal institutions in support of plans devised by central economic authorities (CEA). They participate in the second economy by falsifying inventory records and unofficially allocating commodities to support second economy operations to the three legal industry transactors (TP, PC, LC) and the two

15. Descriptions of the second economy activities of central economic authorities can be found in Staata (1972), Grossman (1977, 1982), Simla (1977, 1982), Montias and Rose-Ackerman (1981), and Wiles (1982).

illegal ones (SC, SP).¹⁶ Supply officials receive bribes from subordinate organizations in payment for these services and in turn pay bribes to the central economic authorities (CA) to ensure their collaboration in covering up diversion of resources and to the control agencies (CA) and political authorities (PA) in return for protection services.

C. Quantity and Financial Flows in the Second Economy

The next stage of evaluating the second economy system is to describe the interactions of and exchanges between its ten transactors. Given the adopted national accounts approach to system description, second economy transactions should be expressed in terms of stocks and flows. Among the instruments that can be used to accomplish this are matrices and diagrams.

At least four different matrix representations of second economy transactions are possible, at least conceptually. The exchanges between the transactors identified in section II.B could be depicted by a 10 x

10 transaction matrix that shows the flows out of transactors along the rows and flows into them down the columns. A second option would be to examine transactions at a more aggregated level using a 3 x 3 partitioned matrix with the transactors grouped into: (1) households (HO), (2) industries (PC, LC, SC, FP, SP), and (3) government agencies

¹⁶ Among the sources of information concerning the role of central supply agencies in the second economy are Staats (1972), Simeg (1975), Grossman (1977, 1982), Sims (1977, 1981), Schwartz (1979), Montiel and Rose Ackerman (1981), Kroncher (1982), and Lampert (1984). Franklin (1981) presents an interesting, complementary study of corruption in foreign trade organizations.

(PA, CA, CR, CS). Alternatively, second economy transactions could be associated within the framework of an input-output model. Quadrant I would be the square inter-industry exchange matrix that would include appropriately disaggregated industries within the transactor categories FC, LC, SC, FP and SP; probably the government agencies PA, CA, CR, CS, which could be treated in the same way as government enterprises or insurance firms; and imports, which are of importance to the second economy (Kendrick (1972, Chapter 5)).¹⁷ Quadrant II would be the final demand matrix (personal consumption, gross fixed capital formation, net inventory change and net exports) and Quadrant III would be the value added matrix. A fourth matrix description of the second economy system could be based on the national accounts. Suitable production, consumption, accumulation, and foreign exchange accounts could be established for each of the ten second economy transactors and then re-grouped into a national accounts matrix of the type outlined in United Nations (1968, Chapter II).

¹⁷ It should be noted that the practical difficulties associated with utilizing the input-output model to represent second economy transactions are considerable. There are the usual problems of defining industries so there is no joint production of commodities and justifying the assumption that inputs are used in fixed proportions in industries that operate in the unstable supply environment of a shortage economy with significant forced substitution (Bauwol (1972, Chapter 20)). Collection of data on illegal production and consumption of commodities is another major obstacle. Treatment of government agencies is problematic as well. Normally they are included in Quadrant II (final demand) as consumers of industrial output. However, if they provide illegal but marketable protection services, as suggested in section II.B, then there is some justification for including them in inter-industry Quadrant I as government enterprises (OBE Industry No. 84) or insurance firms (OBE Industry No. 70) (Kendrick (1972, Chapter 5)).

Matrix representations of second economy transactions have the advantage of conceptual clarity and facilitate mathematical analysis. However, they are not suitable for the purposes of this survey paper. The 10×10 and 3×3 transaction matrices mentioned above provide too simplified descriptions of exchange¹⁸ between transactors and neglect the mechanisms of exchange, that is markets, which are frequently the focus of research in disequilibrium and shortage models. Development of input-output and national accounts schemes would result in descriptions of transactions that would be extremely detailed relative to this study's requirements.

Given the inappropriateness of matrix representations, transactions in the second economy system of a PES are described using diagrams that show transactors, important markets, quantitative flows of goods and services, and financial flows.¹⁹ Before presenting them, though, points of clarification should be made concerning the concept of the market and the types of second economy transactions.

With respect to markets, it is made of a broad definition consistent with that of Kornai (1979, p. 127), who argues that markets include 'transaction processes based on direct horizontal relations between supplier and recipient of the goods, even if price and money play little or no role in those processes'. It is appropriate for this paper to define in a similar manner markets based upon vertical relationships between subordinates and superiors.

¹⁸ This author has carried out similar analyses of the institutions (transactors), markets, and transaction flows in the Soviet health sector (Davis 1979, 1984; 1987, Part I, 1987 (b)) and the Soviet defense sector (Davis 1988).

Although the second economy system is highly marketized relative to official sectors of CPBs, this does not mean that all transactions are monetized. In reality four different types of transactions are observable in second economy markets. First, there are exchanges of commodities for money. This type of transaction is dominant in the retail and bazaar markets. A second form of exchange is money for money. Examples of this are foreign currency transactions and the sale and purchase of hard-currency coupons.¹⁹ The third type is barter, or the exchange of commodities for commodities, usually in the same period. Barter has dominated the second economies of most CPBs at various times, such as War Communism (1918-21) in the USSR and the early reconstruction period in Eastern Europe (1945-48). In his article on the 'shadow economy' in CPBs Grossman (1982, p. 106) puts forward the general rule that:

'When excess aggregate demand for producer goods is widespread and chronic, there may well be a tendency for barter to grow in extent and intensity.'

He argues that over 'the last few years' there has been a general aggravation of shortage of producers' goods' in the USSR and that consequently the use of second economy barter has spread. The fourth

¹⁹ In a personal communication to this author Gregory Grossman observed that in the case of the Soviet Union it is unclear whether foreign currency and coupons should be treated as money or goods, given the severe limitations on their use as a medium of exchange. If they are goods, then the transactions mentioned in the text are of the money-goods variety. He also pointed out that in the USSR vodka plays a role in the second economy as near money and is a more important medium of exchange than foreign currency or coupons. It should be noted, however, that the role of foreign currency in the second economy varies by country. Charenza and Ghatak (1988) argue that hard currency, especially dollars, acts as a full substitute for the domestic currency in Poland and Hungary.

type of transaction is the exchange of favors (perhaps best viewed as promises for the future provision of services) that is associated with the Soviet term *blat* (which means influence or pull). According to Grossman (1982, pg. 108):

"Blat like barter, defines exchange, though usually deferred rather than simultaneous, less structured, and with fuzzier equivalents. It is a sort of market, and market principles - and prices - ought to apply to some extent. A blat relationship can be purchased, not only by doing a favor in advance but also by paying regular tribute (or *lobshchiki*, *pobory*) to someone in power, or otherwise becoming a client to a patron."

In light of the complexity of second economy transactions this paper analyzes separately the quantity and financial flows in second economy markets. Section C.1 discusses transactions and flows expressed in quantity terms in the second economy system that are summarized in Diagram 1. The financial flows between the same set of transactors and through similar markets are described in Section C.2 and Diagram 2. As indicated above, the quantity and financial flows often, but not always, are interrelated. In these cases the diagrams can usefully be examined together. It also should be noted that these representations of second economy transactions are of differing relevance to the shortage and disequilibrium models. For example, quantity processes and non price control mechanisms are of considerable importance in the shortage model (Kornai 1980).

In contrast, most disequilibrium econometric studies are concerned with financial transactions and price mechanisms. Kornai (1980) notes that "the central government transactors (CS, CE, CA and PA) receive inputs from or provide outputs to the following government services markets:

- Labor market
- Protection services market
- Regulatory services market
- Capital and intermediate goods market

Their outputs flow to LM, PM, CM, or the CM of other transactors.

The central government transactors (CS, CE, CA and PA) receive inputs from or provide outputs to the following government services markets:

- Protection services market. This distributes illegal services such as unofficial allocations of supplies by CS, false plans by CE, and protection by CA and PA.
- Regulatory services market. This distributes legal regulatory services.

Table 2: Notation Used in Diagram 1

<u>Transactors</u>	
HO	= Households
FC	= First Economy Producer of Consumer Goods and Services
IC	= Legal Private Producer of Consumer Goods and Services
SC	= Illegal Producer of Consumer Goods and Services
PP	= First Economy Producer of Producer Goods and Services
SP	= Illegal Producer of Producer Goods and Services
CS	= Central Supply Agencies
CE	= Central Economic Authorities
CA	= Control Agencies
PA	= Political Authorities

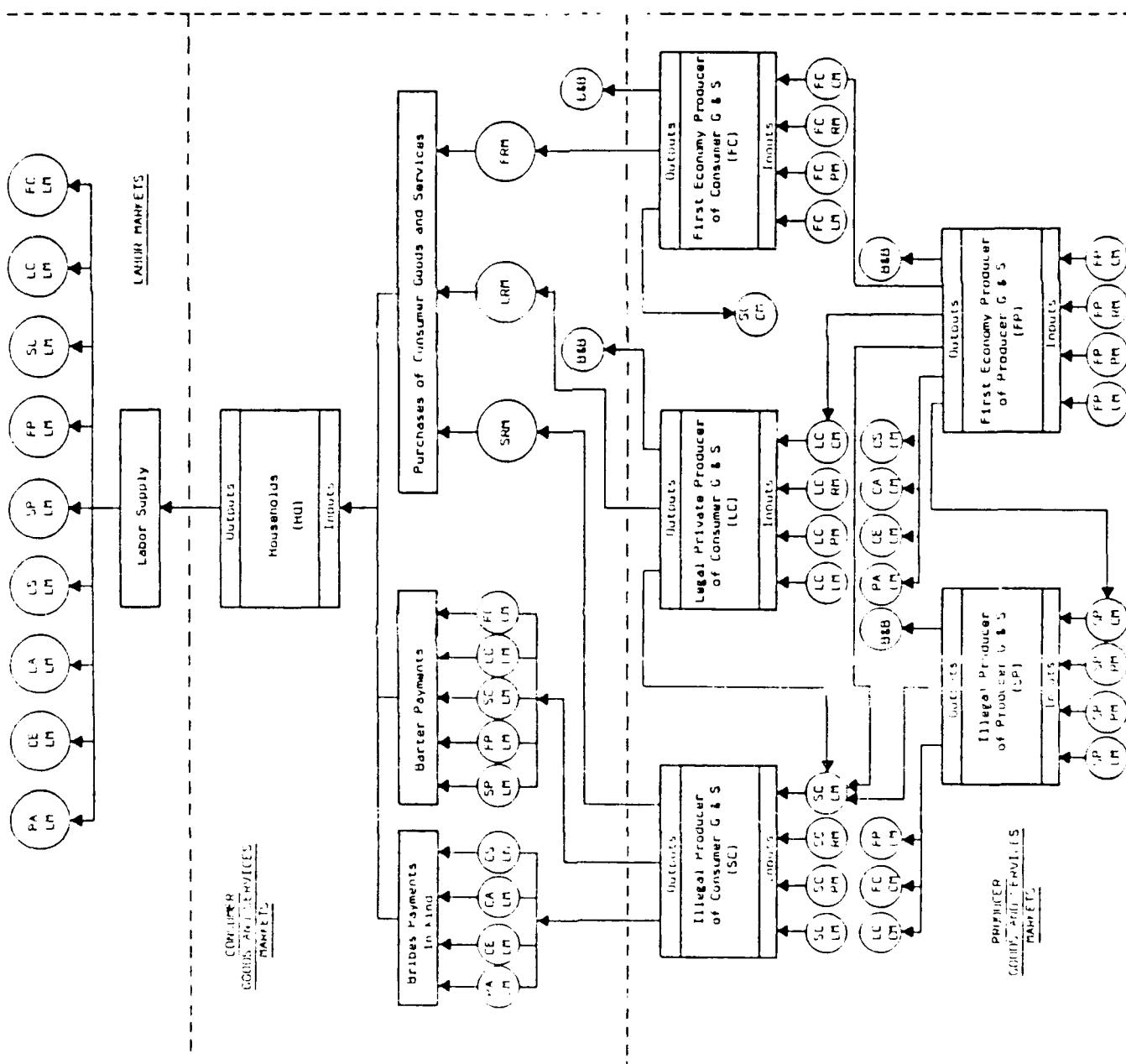
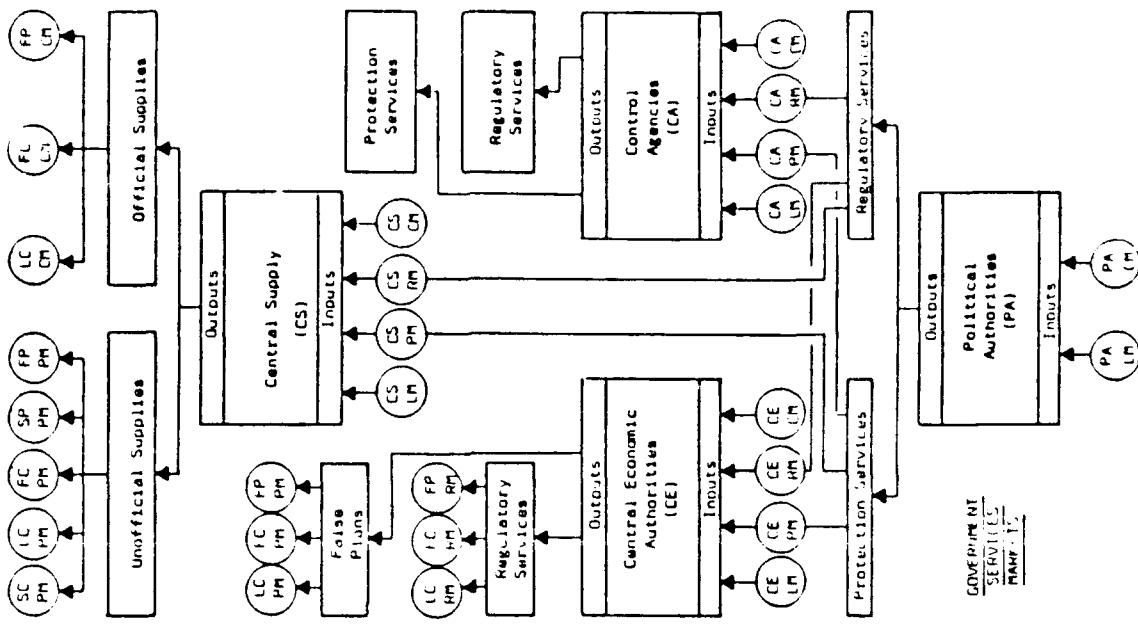
<u>Labor Markets</u>	
Households	provide labor to each of the other nine transactors through labor markets (LM) that are identified by the transactor's abbreviation (PALM, CEJM, SPUM, FPLM, SCIM, LCLM, and FCLM).

<u>Consumer Goods and Services Retail Markets</u>	
Households	receive goods and services through:
FIM	= Official retail market
ISM	= Legal private retail market
SIM	= Illegal retail market
B&B	= Bribes and barter market. Bribes in kind are made through PALM, CEJM, SCIM, and barter payments flow through SPUM, FPLM, SCIM, LCLM, and FCLM. These payments actually are made to transactors and then are re-distributed to their labor forces. For simplicity the diagram only shows the final distribution of SC payments in kind. The equivalent outflows from IC, FC, SP and PP are shown going to consolidated bribes and barter markets.

<u>Producer Goods and Services Markets</u>	
Each of the five industry transactors (SC, LC, FC, SP and PP) receives inputs through four markets:	
LM	= Labor market
PM	= Protection services market
HM	= Regulatory services market
CM	= Capital and intermediate goods market
HM	= Their outputs flow to LM, PM, HM, BB, or the CM of other transactors.

<u>Government Services Markets</u>	
The central government transactors (CS, CE, CA and PA) receive inputs from or provide outputs to the following government services markets:	
PM	= Protection services market. This distributes illegal services such as unofficial allocations of supplies by CS, false plans by CE, and protection by CA and PA.
HM	= Regulatory services market. This distributes legal regulatory services.

**DIAGRAM 1. QUANTITY FLOWS IN THE
SECOND ECONOMY OF A CPE**



Quantity Flows in the Second Economy

The ten transactors in the second economy system described in section II.B engage in exchanges involving quantities of goods and services in labor markets, consumer commodity retail markets, producer commodity markets, and government services markets. Diagram I shows the transactors, markets and quantity flows in the second economy. Its rotation is explained in Table 2. For clarity of presentation the diagram has been subdivided into four sections in accordance with the dominant type of market. The quantity exchanges of the ten transactors are discussed briefly below.

The household sells its labor services in the nine markets that provide labor inputs to the other second economy transactors: (1) PALM labor market of political authorities, (2) CEM (labor market of control central economic authorities), (3) CALM (labor market of control agencies), (4) CSLM (labor market of central supply agencies), (5) SPLM labor market of illegal producers of producer commodities, (6) FPLM labor market of first economy producers of producer commodities, (7) CLM (labor market of illegal producers of consumer commodities), (d) CLM (labor market of legal private producers of consumer commodities), and (9) FCLM (labor market of first economy producers of consumer commodities). These outflows are shown at the top of the diagram. Corresponding inflows are shown on the input side of each transactor. Although all of these markets have links with the second economy, only PLM and CSLM exclusively handle illegal transactions.

The household receives inputs of goods and services from transactions in retail, bribes, and barter markets. As the diagram shows,

there are three types of retail markets. The official retail market (FRM) supplies goods and services produced in the first economy to households in return for cash payments. The second source is the legal private retail market (LPM), such as the collective farm market. The illegal retail market (SLM) is the third channel through which the household receives goods and services in return for cash payments.

In addition, households receive consumer goods and services as barter payments for labor services related to the second economy provided to the industry transactors SP (illegal producers of producer commodities), FP (first economy producers of producer commodities), SC (illegal producers of consumer commodities), LC (legal private producers of consumer commodities), and FC (first economy producers of consumer commodities). For example, an auto mechanic working at a state enterprise (FC) but involved in the second economy may repair the personal car of his supplier of stolen spare parts rather than make cash payments. Some bribes provided to higher government authorities (CS, CR, CA and PA) for protection, supply, or false planning services are in kind as well (e.g. food, clothing, animals, construction services). For example, a pharmacy selling scarce heart medicine under-the-counter in SLM (illegal retail market) may make part of the pay-off to inspectors from CS (central supply agencies) in the form of drugs. To keep Diagram I as simple as possible, the barter and bribes payments made in the various labor markets are shown only for the transactor SC. Payments in kind made by LC, PC, SP, and FP are aggregated and denoted on the output side by the circle marked B & B. No attempt has been made to describe the flow of bribes in kind to the

political authorities (PA) from the government agencies directly making them (CS, CR, CA). Instead, they are attributed to their industry source (e.g. SC, LC, IC, SP, PP).

The five industry transactors shown in the producer goods and services markets section of the diagram produce commodities and utilize four types of inputs: labor acquired in labor markets (LM) as discussed above; capital and intermediate goods and services obtained in CM; regulatory services of CA (control agencies) through HM; and protection services obtained in PM. The legal industry transactors (IC, LC, PP) are also required to make use of the official regulatory services of CR (central economic authorities) that are provided through HM (regulatory services market) in the forms of plans, budgets, and regulations.

In the case of the first economy producer of consumer commodities (IC), part of its output of consumer goods goes to official retail markets (HM) for sale to households at prices fixed by the state. Another portion of output flows to ICC (capital and intermediate goods market of illegal producer of consumer commodities) for further processing and distribution through illegal retail markets (SM) as the result of either conscious maneuver or low-level theft. It receives inputs of capital and intermediate goods that are either officially allocated by CS (central supply agencies) and legally supplied by PP (first economy producer of producer commodities) or illegally provided by SP (illegal producer of producer commodities).

The central authorities impose planned budgets on IC and monitor its activities. In order to circumvent the regulations and constraints of

superior bodies and to engage more safely in illegal activities on the output or input side the firm has to pay in cash or kind for protection services of government agencies CS, CR, and CA obtained in the protection market (CPM). This is shown as a flow of output to the bribes and barter market (BB).

The output of IC (legal private producer of consumer commodities) is divided between bribe and barter payments in BB, sales in the legal private retail markets (LM), and supply to SC through SCM for redistribution in the illegal retail market (SM). Legal private enterprises are entitled to obtain some legal inputs from PP (first economy producer of producer commodities) and CS (central supply agencies) through the capital and intermediate goods market (CM), but much material comes from SP. Regulation of IC is less severe than that of first economy producers of consumer commodities (FC) and of a different character. Due to its considerable involvement in illegal activities associated with the distribution of output to SC and acquisition of inputs, the IC has to obtain a significant volume of protection services from control agencies (CA) through CPM.

The output of goods and services of SC (illegal producer of consumer commodities) flows to: the illegal retail market (SM) for sale to households; barter markets as payment for goods and services provided by the transactors SP, PP, LC, and IC, as well as by the labor force of SC itself; and to protection markets (CPM) as bribes to elements of the

labor force of the government agencies PA, CB, CA, CS.²⁰ The SC enterprise illegally obtains inputs of labor through SCIM and commodities for re-sale or processing through SCCM. The state attempts to restrict the scale of these illegal activities by having CA (control agencies) provide regulatory services through SCIM. The severity of these regulations can fluctuate over time in accordance with central policy and the degree of offsetting protection purchased by SC from CA in SCIM.

The first economy producer of producer goods and services (PP) dominates producer commodity markets. Most of its output is supplied to other legal industry and government transactors through intermediate and capital goods markets (PCM, LCM, CCM, CALM, PACM) in accordance with plans. The residual output supports illegal activities. Some can be adapted to make bribes payments, such as the construction of a dacha for a corrupt party or state official by the building industry. First economy and legal private producers of consumer commodities (PC and LC) can receive greater amounts of supplies than are necessary for planned activities. Additional shares of output are diverted by corrupt smugglers or thieves in the enterprise to the illegal intermediate and capital goods markets SCCM and SPCM. With respect to inputs, this

²⁰ For simplicity, the diagram depicts the payments in kind made by SC in barter and bribes markets as flows of output to households through the labor markets of industry transactors receiving barter (SPM, PPM, SCIM, LCM, and PCIM) or of government transactors receiving bribes (PALM, CLM, CALM, CSIM). This is a simplification of the in kind payment process. For example, an illegal producer of consumer commodities (SC) might provide part of its output to a first economy producer of producer goods (PP) that delivers necessary intermediate goods to SCOM. The managers of PP could then distribute the consumer products to its labor force, which would constitute an in kind payment for labor services provided by households in PPM.

transactor legally obtains labor from PPM and capital and intermediate goods from its own production (not shown) or from central supply agencies (CS). It also illegally acquires producer commodities from SP. The first economy producer of producer commodities (PP) involuntarily receives regulatory services in SPCM and elects to purchase protection services from CA, CB and CS.

Illegal production of producer goods and services by SP plays a vital role in the functioning of the first economy. Its output of intermediate and capital commodities is supplied illegally to PC (first economy producer of consumer commodities) through PCM and to PP (first economy producer of producer commodities) through PCM on a cash or barter basis. Often these illegal inputs are used by state enterprises to fulfill official plans. Another component of SP output goes to the second economy industry transactors LC (legal private producers of consumer commodities) through LCM and SC (illegal producers of consumer commodities) through SCCM to enable them to meet their unofficial production targets. The remainder of its output is supplied to central government transactors CA, CS, CB as bribes in kind. SP acquires capital and intermediate goods from its own production or from PP through SPCM. Given the commitment of the authorities to eliminate any large scale illegal production of producer goods, SP must obtain as much protection as possible from CA through SPCM.

The four government transactors CS (central supply agencies), CP (central economic authorities), CA (control agencies), and PA (political authorities) officially obtain inputs of labor, capital, and intermediate goods in the markets shown in Diagram 1 and provide legal

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supply and regulatory services. Each also has a second economy side-line. US illegally diverts intermediate and capital goods to industry transactors through the protection markets SCM, LCM, SCM, SPM, and RHM to support of second economy activity. The transactors UK, CA, and LA provide protection services to government agencies through the protection markets CSIM, CSM, CAFM and to industry transactors through SCM, LCM, SCM, SPM, and RHM.

As should be evident from the above description of Diagram 1 numerous transactions in the second economy system are made in quantity terms. They include all barter exchanges, most black related transactions, and a share of bribes payments. This suggests that second economy activities are strongly influenced by what Kornai (1980) calls non price transaction processes and control mechanisms. Furthermore the quantity flows shown in Diagram 1 underly most of the financial transactions described below in Diagram 2.

2. Financial Flows in the Second Economy

The financial exchanges between transactors in the second economy can be of two types: commodity money and money money. Commodity-money transactions are financial referents of the quantity ones discussed above and are made in markets such as in Diagram 1. In contrast, money money exchanges are exclusively financial in nature and involve markets and flows not yet examined in this section an attempt is made to describe the financial flows of the second economy with the help of Diagram 2. As a prelude, thought some comments are made concerning money and prices in the second economy.

²¹ illegal conversions of domestic to foreign currency also at a rate by those about to emigrate, who intend to smuggle the funds out, and by second economy entrepreneurs (SC and SP), who require hard currency to purchase foreign goods for export.

Although Diagram 2 does not distinguish between types of financial flows there are three different forms of money utilized in the second economy. Domestic currency (or cash) is used to make payments to households (wages, transfers, returns on capital investment), to purchase goods and services in retail markets, to buy illegal producer goods, and to acquire protection services (i.e. to make cash bribes). Bank money (or beznalichye sledstva in the USSR) is used to finance official transactions of first economy industries (FC and FP) or government agencies (PA, CA, Ct, and CS). Since second economy financial transactions are carried out on a cash basis and most economic organizations are involved in them, there is continuing pressure on enterprises to raise cash using the illegal methods described by Grossman (1982, pp. 109-110). The third type of money is foreign currency. Its significance in the second economy varies by country (see footnote 19). But as a general rule, CPEs have an illegal foreign currency exchange market (LDM) that enables households (and to a lesser extent firms) to convert cash into foreign currency, or vice versa, for use as illegal payments for goods and services in domestic markets.²¹

Prices in the second economy system have certain features that distinguish them from state prices in official retail markets (RHM) and producer goods markets. In general, second economy prices are not set by government bureaucrats, but rather are influenced by supply and demand forces. They therefore are more flexible and responsive to market conditions. There is, of course, some government regulation of illegal conversions of domestic to foreign currency also at a rate by those about to emigrate, who intend to smuggle the funds out, and by second economy entrepreneurs (SC and SP), who require hard currency to purchase foreign goods for export.

the prices charged by legal private producers of consumer commodities (LC) in the legal private retail market (LM). However, it appears that these constraints are routinely evaded. Most of the second economy transactions in markets for consumer goods (SM), foreign currency (HM), producer goods (e.g. SCM), and protection services (e.g. FPM) are illegal and involve unregulated prices. This does not mean, though, that ideal competitive markets and prices exist in the second economies of CPMs. In fact, government intervention and societal norms can exert substantial influences on prices.

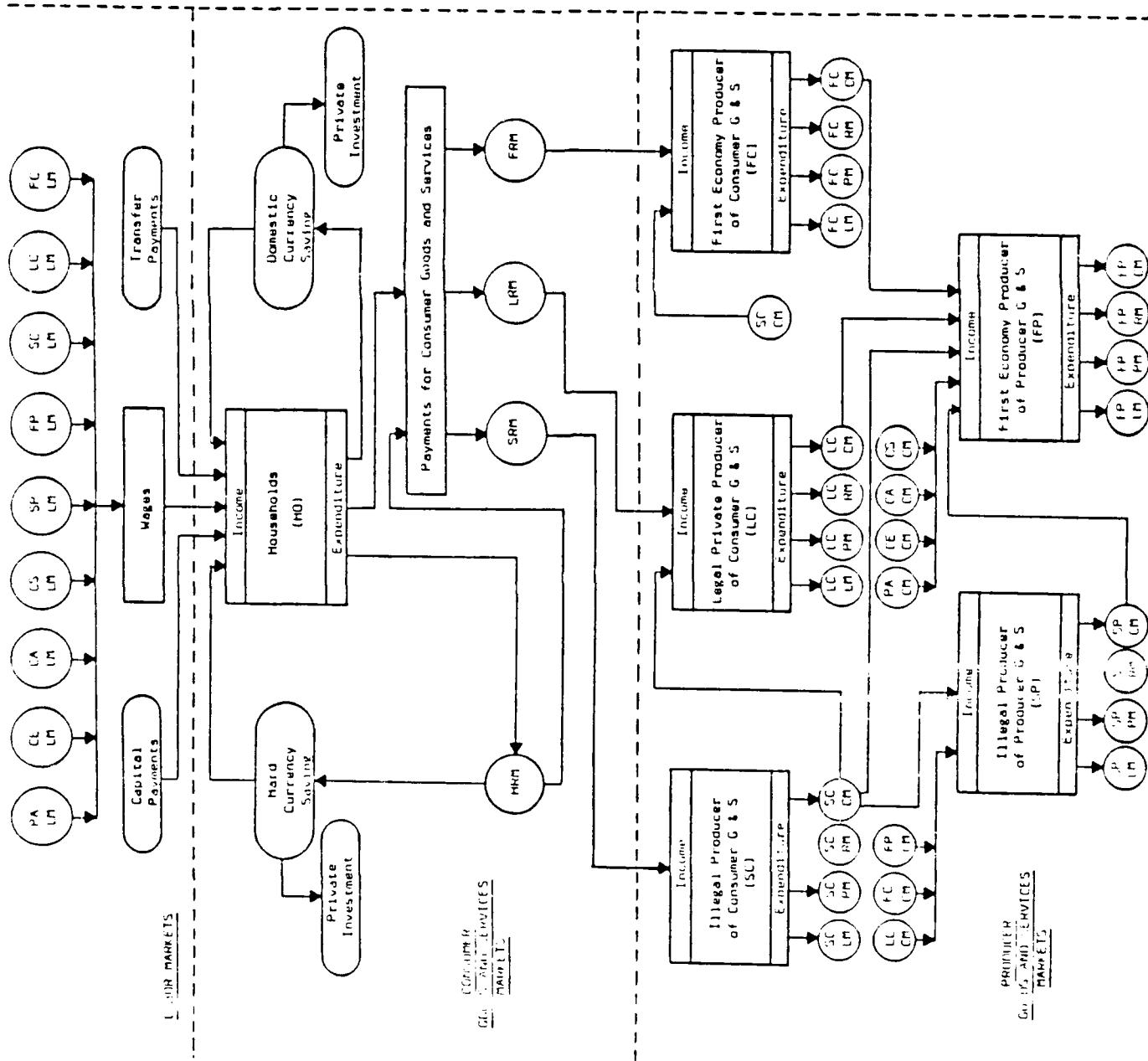
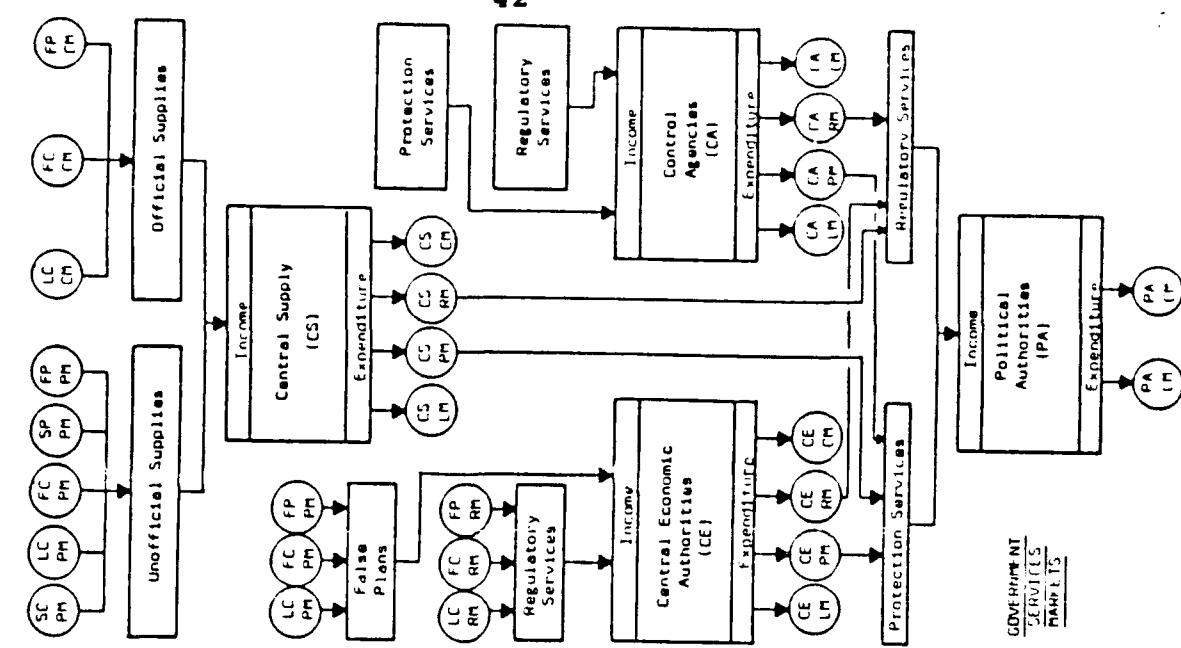
The experiences of socialist countries indicate that government policies toward the second economy fluctuate over time from repressive to tolerant. If the political authorities (PA) decide to suppress illegal private activities, as in the USSR under Gorbachev, then this normally entails purges of corrupt members of government organizations (CA, CR, CS), the issuing of orders to control agencies to crack down on unauthorized private business, and arrests of second economy transactors. Such campaigns at least temporarily disrupt bilateral relationships and supply processes, intensify the risks confronting private transactors of arrest and punishment, and increase quite drastically the cost of insurance (or protection services). This in turn reduces the supply of illegal goods and services and raises their prices.

Furthermore, a crackdown could impose short term quantity constraints on the second economy if new policing and inspection programs impede the normal theft of state property from enterprises or the unofficial provision of input commodities by central supply agencies. In times of high risk, control agencies (CA) may withdraw protection services

Table 3: Notation Used in Diagram 2

<u>Transactors</u>	
HO	Households
FC	First Economy Producer of Consumer Goods and Services
LC	Legal Private Producer of Consumer Goods and Services
SC	Illegal Producer of Consumer Goods and Services
FPM	First Economy Producer of Producer Goods and Services
SP	Illegal Producer of Producer Goods and Services
CS	Central Supply Agencies
CB	Central Economic Authorities
CA	Control Agencies
PA	Political Authorities
<u>Labor Markets</u>	
SMH	Households receive wage payments from each of the other nine transactors through labor markets (LM) that are identified by the transactor's abbreviation (PALM, CKLM, CALM, CSLM, SPML, YPLM, SCLM, LCLM, and RCLM).
<u>Consumer Goods and Services Retail Markets</u>	
SGM	Households make payments for consumer goods and services in the following markets:
LM	Illegal retail market
LM	Legal private retail market
FIM	Official retail market
HIM	They also exchange domestic and foreign currency in:
HIM	Illegal foreign currency exchange market
<u>Producer Goods and Service Markets</u>	
SC	Batch of the five industry transactors (SC, LC, FC, SP and FP) makes payments for goods and services obtained in their associated:
LM	Labor market
CM	Capital and intermediate goods market
PM	Protection services market. These payments consist of cash bribes for unofficial supplies, false plans, or protection services of CA.
IP	In addition, the state extracts payments (e.g. taxes) from LC, FC, and FP which can be viewed as a return for regulatory services provided in:
HIM	Regulatory services market
<u>Government Services Market</u>	
The central government transactors receive income from payments for services provided in:	
HM	Regulatory services market
PM	Protection services market. The illegal payments made in protection markets are for unofficial allocations of resources, false plans, and protection.
Each of them makes payments for labor services (to its LM) and for capital and intermediate goods (to its CM). In addition, CS, CK, and CA make bribe payments to PA for protection through the transactor's protection market (HIM).	

DIAGRAM 2: FINANCIAL FLOWS IN THE
SECOND ECONOMY OF A CPE



irrespective of price offers of clients, which could halt many second economy operations. This type of behavior is similar to that of insurance agencies suspending oil tanker coverage in a war zone if the intensity of combat rises above normal levels.

Societal norms can constrain second economy prices as well.²² In most CPBs there probably are informal upper tolerance limits of black market prices in illegal retail markets (SM) defined by popular attitudes. As long as prices remain below the limit then the public makes a minimal number of complaints to control agencies (CA) and risks of the operations of SC are low. If, however, an illegal producer of consumer commodities (SC) raises the price above the limit, perhaps in an economically justifiable response to supply disruptions, then this could so upset consumers that the frequency of denunciation to CA, and thereby the risk of arrest, grows markedly. The existence of such norms may be one reason why commodities stolen from state enterprises that are in deficit in legal markets are offered for sale in illegal markets at prices below their official levels (Simes (1975, pg. 44)).

Diagram 2 depicts the financial flows in the second economy system of a CPB. It contains the same ten transactors and most of the markets of Diagram 1, but focuses on monetary instead of quantity transactions and flows. The main differences are that Diagram 2 excludes the representation of the flows into households of barter payments and bribes in kind and includes returns on capital investment and transfer

²² The role of informal societal norms in controlling the second economy was clarified through a discussion with Anders Aslund in January 1988.

payments to households, saving and private investment, and the unofficial foreign currency exchange market. Another distinctive feature of Diagram 2 is that it shows income-expenditure flows of transactors rather than their output input flows of goods and services.

The household (HO) is a transactor that is involved in many of the important financial processes of the second economy. The main component of household income is comprised of wages, which are payments for labor services provided in the nine markets shown in the diagram. Of these, wages obtained in SPIM and SCIM represent entirely illegal flows. The other seven markets generate legal income to the extent that labor services are devoted to officially approved activities. However, Diagram 1 showed that LC (legal private producer of consumer commodities), PC (first economy producer of consumer commodities), and FP (first economy producer of producer commodities) provide goods and services to illegal transactors SC and SP. For this they receive both barter and cash payments. A portion of the latter is re-distributed to employees of LC, PC, and FP and flows into households along with legally earned wages. The central government transactors (PA, CS, OR, and CA) provide unofficial supply, false planning and protection services in return for bribes in cash (payments in kind are discussed above). This second economy money flows into household accounts through PAIM, CSLM, CBLM, and CALM together with official government wages.

Households also receive transfer payments from central economic authorities (CA) such as pensions, benefits, and stipends and pay taxes on legal income. Most transfer payments are legal, but in socialist

countries, as elsewhere, there is a certain amount of swindling of the welfare state. The resulting illegal transfer payments can be viewed as additional second economy income resulting from private initiative. The diagram shows that a third type of income is made up of capital payments, which represent returns to households from their private investments in the legal activities of LC and the illegal ones of SC and SP.

Households utilize their income on consumption and saving. As indicated in the diagram, they spend domestic currency on the purchase of consumer goods and services in the official retail market (IRM), the legal private retail market (LPM), and the illegal retail market (SRM). The distribution of expenditure on current consumption across these markets varies over time. In general, the higher the excess demand (or shortages) in IRM the greater the volume of transactions in LPM and SRM.²³ A second flow of money out of the household goes to the illegal foreign currency exchange market (HFM) for conversion into hard currency for current period purchases of consumer goods and services in retail markets.

A portion of income, dictated by the savings function, flows into the stocks of saving maintained by households. The diagram shows one flow into domestic currency saving. Another one is through the illegal

²³ It should be noted that if households are subdivided into the categories elite, professionals, unskilled workers, unskilled workers, and the disadvantaged, then one would observe considerable variation in participation in the second economy with respect to both provision of labour services and the reverse flow of income and purchases of commodities in private retail markets (LPM and SRM). This point is alluded to in Sip's (1975, pg. 43). See also the discussion below on pp. 119-121.

foreign currency exchange market (HFM) into hard currency saving. In a given period households can also convert domestic currency saving to hard currency saving, but these flows are not shown in Diagram 2.

To complete the presentation of the financial situation of the household in the second economy system it is necessary to make a few comments about wealth. Households in CPAs hold their wealth in money, legal bonds, legal property, and illegal equities. Money is comprised of cash holdings and low interest savings deposits (the socialist country equivalent of demand deposits). The demand for money is a function of income, price level, and interest rates. More specifically, households have transaction and precautionary motives for holding money. The transactions motive implies that people demand a certain level of real money balances to finance an anticipated volume of transactions. The demand for nominal money balances therefore increases with the price level. In addition, the transaction motive is affected by movements in income and the degree of synchronization of payments and receipts. If disequilibrium in retail markets increases then synchronization problem will grow, as will the demand for money. This is related to the precautionary motive for holding money, which expresses the desire to keep sufficient funds in accessible form to be able to take advantage of uncertain consumption opportunities. In CPAs the transaction motive is of significance due to the unreliability of

supplies in official retail markets (IRM) and the uncertainty associated with the operations of the illegal retail market (SRM). A final factor determining holdings of money in low interest bank accounts is the assets motive, which is a reflection of the desire to keep a share of

wealth in an asset form with a low but predictable rate of return.

In traditional CPIs households also can legally invest their wealth in property (e.g. cooperative flats, private houses, jewelry), in state savings bonds, and, with many restrictions, in firms in the transactor category of legal producer of consumer commodities (LC). Illegal investment opportunities exist as well. Households can invest domestic or hard currency in illegal producers of consumer and producer commodities (SC and SP). In effect this is equivalent to illegally purchasing equity in these firms. For simplicity Diagram 2 shows only stocks of domestic and hard currency savings, flows into them, and the outflows of private investment. The returns on investment are depicted as capital payments on the income side of households.

The section of Diagram 2 entitled 'Producer Goods and Services Markets' shows the income and expenditure flows of the five industry transactors. First economy producers of consumer commodities (FC) and legal private producers of consumer commodities (LC) receive most of their income from legal sales of consumer goods and services in official and legal private retail markets (FCM and LCM). Both obtain additional revenue from the illegal sales of their commodities in the capital and intermediate goods market of illegal producers of consumer commodities (LCIM). They legally use their income to purchase intermediate and capital goods and services in FCM and LCIM and labor services in FCIM and LCIM. The flows to the regulatory services markets FCOM and LCIM represent payments of taxes and other official charges imposed by central economic authorities (CE). In addition, these transactors make various illegal expenditures: in protection services markets FCPM and

LCIM for protection by control agencies (CA), unofficial supplies from central supply agencies (CS), and false plans from central economic authorities (CE); in labor markets FCLM and LCIM for unofficial labor services; and in capital and intermediate goods markets FCOM and LCIM for commodities obtained from illegal producers of producer goods.

The illegal producer of consumer commodities (SC) receives all its income from sales in the illegal retail market (SJM). Illicit expenditures are made on labor services in SCIM, bribes for protection by control agencies (CA) in SCIM, and consumer and producer goods and services in SCOM.²⁴ In the latter case, illegal money flows to the industry transactors LC, FC, FPM, and SP. No payments (e.g. taxes) are made to regulatory agencies.

First economy producers of producer commodities (FP) receive official income from sales of products to the other two legal industry transactors (FC and LC) and the four government agencies (PA, CA, CK, CS). Unofficial income is obtained from sales made to illegal producers of consumer and producer commodities (SC and SP). The income of

24 The representations of the financial operations of the illegal producer of consumer commodities (SC) and the illegal producer of producer commodities (SP) appear to be consistent with the black value added formula of Miles (1962, pg. 126), which is:

$$P_B = I_{RL} + I_{SP} + L_B + B$$
where P_B = black production, I_{RL} = inputs legally acquired in retail markets, I_{SP} = inputs stolen from the state, L_B = hours of black labor at the black wage, and B = bribes necessary to protect the operation. Using the terminology of this paper in the case of SC: I_{RL} = inputs acquired from LC and FC; I_{SP} = illegal inputs from LC, FC, SP and FPM; L_B = labor services obtained in SCIM; and B = protection service payments made in SCIM.

IP is spent on official and unofficial wages of staff in FPM, protection services in FPM, mandatory regulatory services in FPM, and authorized supplies purchased from FP and illegal inputs obtained from SP in FPM.

Illegal producers of producer commodities (SP) obtain their income from illegal sales in SCM, LCM, and FPM. Their expenditures are illegal and consist of wage payments in SPM, bribes in SCM, and purchases of stolen or diverted producer goods in SPM. No taxes are paid to CG in SPM.

Diagram 2 shows that each of the four government transactors receives income that is illegal. Illicit funds flow into central supply agencies (CS) in return for the unofficial distribution of controlled supplies. Similar rewards are made to central economic authorities (CA) for preparing false plans and to control agencies (CA) for protecting other transactors. A portion of the illegal income of CS, CA, and CA is passed on to the political authorities (PA) for high level protection services (Grossman 1979) called a 'gatekeeping' fee). The illegal payments made to government organizations eventually flow into households through the labor markets CSM, GELM, CALM, and FALM.

On the legal side, CS receives income from the official distribution of supplies to LC, FC and FP and makes purchases of labor services in CSM, regulatory services in GELM, and producer goods and services in CSM. CS is the state budget and banking authority so it receives payments of taxes and currency from LC, FC, and FP. It distributes transfer payments to households and spends money on labor

services in CSM, regulatory services in GELM, and producer goods and services in CALM. Various legal payments are made to control agencies (CA), such as fines and license fees. Expenditures are made on labor in CALM, producer goods and services in CALM, and regulatory services in CALM. Finally, PA receives legal income from CS, CG (budget allocations), and CA and purchases labor in PALM and various producer commodities in PACN.

D Summary of the Description of the Second Economy System

Models of disequilibrium and shortage examine various aspects of the diverse set of transactors, markets and transactions that comprise the second economy of a CPS. In order to assess their coverage and treatment of issues it is necessary to have a definition of the second economy that can be used as a common standard.

The definition that is utilized in this paper is influenced by past work of Grossman (1977, 1979) and others on the second economy as well as by the systems analysis methodology employed by Stone (1970a) in his survey of mathematical models in educational planning. Stone argues that in order to evaluate the contributions of models it is helpful to relate them to the system they are supposed to portray and to the stages of system analysis. These stages are: isolation and definition of the system; description of the system's institutions, activities, and variables; theoretical formulation of models that connect variables, collection of relevant data; estimation of parameters in relationships; assessment of the success of the system in achieving its aims; and

development of policies to help regulate the system. In Part II the second economy system of a CFS is defined and described. This provides a framework for the subsequent assessment in Parts IV and V of the contributions of disequilibrium and shortage models to the analysis of the second economy system.

The second economy of a CFS is defined as a system comprised of all transactors and markets involved in activities of production and exchange which have the characteristics of being for private gain and/or illegal. The description of this system is based on national accounting concepts, which also provide the foundation for economic models. A national accounts description of an economic system involves: identification of transactors, such as households and industrial firms; grouping of transactors in accordance with activity or purpose; and stock-flow description of their activities and transactions in the areas of production, consumption, income and outlay, capital formation and capital finance (Kendrick (1972), United Nations (1968)).

Transactors in the second economy system can be found in three national accounts categories: households (HO), industries, and government producers of services. Several distinct agents are included in each of the latter two groupings. Industries are transactors that engage in the activity of production of commodities (e.g. goods and services that are sold in markets at prices that normally cover production costs). The industry transactors in a second economy system are: first economy producers of consumer commodities (NC); legal private producers of consumer commodities (LC); illegal producers of consumer commodities (SC); first economy producers of producer commodities (FP);

and illegal producers of producer commodities (SP).

The third general category of second economy transactor is producer of government services, which is made up of economic units primarily financed by the state budget. One can find evidence that most types of government organizations are involved in illegal transactions. For analytical purposes, however, the paper allocates most government service producers to the categories PC (first economy producer of consumer commodities) and FP (first economy producer of producer commodities). It isolates for special attention second economy transactors in the United Nations (1968, Table 5.3) categories of general administration, public order and safety, and economic regulation. These are political authorities (PA), control agencies (CA), central economic authorities (CE), and central supply agencies (CS).

The ten transactors that are identified above (HO, NC, LC, SC, FP, SP, PA, CA, CE and CS) comprise the basic units of the second economy system in a CFS. They all engage in the activities of: consumption of inputs of labor, capital and intermediate goods; production of goods and services; and provision of goods and services to other transactors through a variety of markets (see footnote 4 concerning household production theory). All transactions of illegal producers of consumer and producer commodities (SC and SP) are illegal and financed by sales in markets. The other eight transactors are involved in both legal and illegal activities that are supported by market sales and the state budget. The institutional, output, and input characteristics of the second economy transactors are summarized in Table I and described in

more detail on pages 13-25.

The next stage of evaluating the second economy system is to describe the interactions of and exchanges between its ten transactors. Given the adopted **optional accounts approach** to **systems description**, second economy transactions should be expressed in terms of stocks and flows. Among the instruments that can be used to accomplish this are matrices and diagrams. However, a review of transactions matrix, input-output, and national accounts matrix representations suggests that they are not suitable to this paper. Accordingly, transactions in the second economy system of a CPG are described using diagrams that show transactors, important markets, quantity flows of goods and services, and financial flows. In doing this the broad definition of markets of Kurzai (1980, pg. 127) is adopted which includes transaction processes based on direct horizontal or vertical relations between supplier and recipient of the goods, even if price and money play little or no role in these processes. It also is recognized that four different types of transactions are observable in second economy markets: commodities for money; money for money; commodities for commodities (barter); and favors for favors (the bi-lateral relationship). In light of the complexity of second economy transactions, separate descriptions are presented of quantity and financial flows.

The ten transactors in the second economy system engage in exchanges involving quantities of goods and services in labor markets, consumer commodity retail markets, producer commodity markets, and government services markets. Diagram 1 shows the transactors, markets, and quantity flows in the second economy. Its notation is explained in

Table 2 and quantity transactions on pages 32-38.

The household (HO) is involved in transactions in labor, retail, bribes, and barter markets. It acts labor services in the nine markets (denoted with a suffix LM) that provide labor inputs to the other second economy transactors: PALM, CALM, CSIM, SPIM, SCIM, LCIM, and FCIM. Although all these markets have links with the second economy, only SPIM and SCIM exclusively handle illegal transactions. HO receives inputs of goods and services from transactions in the official retail market (FIM), legal private retail market (LPM), and illegal retail market (SIM). In addition, households receive consumer commodities as barter payments for labor services related to the second economy provided to industry transactors (SP, IP, SC, LC, FC) and as in kind bribes payments for protection services delivered by government transactors (CS, CG, CA and PA).

The five industry transactors produce commodities and utilize four types of inputs: labor acquired in labor markets (LM); commodities obtained in capital and intermediate goods markets (CM); regulatory services of CA (control agencies) through RM (regulatory services market); and protection services purchased in PM (protection services market). The legal industry transactors (FC, LC, FP) are also required to make use of the official regulatory services of CK (central economic authorities) that are provided through RM in the form of plans, budgets, and regulations.

The three consumer commodity industry transactors (FC, LC, and SC) supply part of their output to the official, legal private, and illegal retail markets (FIM, LPM, and SIM). FC and LC divert a portion of the

goods and services they produce to SC through SiCM. Each also makes in kind payments with its consumer commodities in barter and bribes markets (bbl). The first economy producer of producer commodities (PP) legally supplies its output to the two industry transactors FC and LC and to government agencies PA, CA, CK and CS. PP illegally diverts its producer commodities to SC and SP. The illegal producer of producer commodities (SP) illicitly supplies its output to the other four industry transactors (FP, FC, LC, and FC).

Diagram 1 indicates that the four government transactors (PA, CA, CS, and CK) officially obtain inputs of labor services and capital and intermediate goods in their respective LN and CM. On the output side they provide other transactors legal regulatory services and supplies. Each also has second economy side-line services that are provided through protection services markets. CS illegally diverts intermediate and capital goods to industry transactors in support of second economy operations. CK engages in false planning and CA and PA provide protection services to other government and industry transactors.

The discussion of Diagram 1 makes it clear that numerous transactions in the second economy systems are conducted in quantity terms. They include all barter exchanges, most blat-related transactions, and a share of bribes payments. This suggests that second economy activities are strongly influenced by what Kornai (1980) calls non-price transactions processes and control mechanisms.

The financial exchanges between transactors in the second economy can be of two types: commodity-money and money-money. The former are financial reflections of quantity transactions, whereas the latter are stocks of saving maintained by households. Private investment in the legal transactor LC or the illegal ones SC and SP is shown as outflows from saving stocks.

exclusively financial and involve markets and flows not examined in Diagram 1. Financial transactions and flows in the second economy system are described in Diagram 2 (its notation is explained in Table 3). It contains the same ten transactors and many of the markets of Diagram 1, but excludes the representation of the flows into households of barter payments and bribes in kind and includes returns on private capital investment and transfer payments to households, saving, private investment, and the unofficial foreign currency exchange market.

Another distinctive feature of Diagram 2 is that it shows income-expenditure flows of transactors rather than their output-input flows of goods and services. Money and prices in the second economy are discussed on pages 39-43 and the financial transactions of Diagram 2 are described on pages 43-50. Only a summary is presented below.

The household (HO) is a transactor that is involved in many of the important financial processes of the second economy. Household income is comprised of legal and illegal wages, transfer payments, and returns from private investment. The HO utilizes its income on consumption and saving. It spends domestic currency on the purchase of commodities in the official, legal private, and illegal retail markets (FNM, LNM, SNM). A second flow of money out of the household goes to the illegal foreign currency exchange market (HNM) for conversion into hard currency for current period purchases of consumer goods and services in retail markets. Finally, income flows into the domestic and foreign currency stocks of saving maintained by households. Private investment in the legal transactor LC or the illegal ones SC and SP is shown as outflows from saving stocks.

Diagram 2 shows the income and expenditure flows of the five industry transactors. PC and LC receive most of their income from legal sales of consumer commodities in official and legal private retail markets (PCM and LCM). Both obtain additional revenue from the illegal sales of their commodities to SC . They legally use their income to purchase labor, intermediate goods, and capital commodities. The flows to the regulatory services markets PCM and LCM represent payments of taxes and other official charges imposed by the central economic authorities (CK). In addition, these transactors make illegal expenditure to obtain: protection services from CA , unofficial supplies from CS , and false plans from CG in the PCM and LCM ; unofficial labor services in $PCLM$ and $LCLM$; and illegal producer commodities from SP in PCM and LCM .

The illegal producer of consumer commodities (SC) receives all its income from sales in the illegal retail market (SM). Illicit expenditures are made on labor services in SCM , on bribes for protection by CA in $SCPM$, and on consumer and producer commodities in $SCCM$. Illegal producers of producer commodities (SP) obtain their income from illegal sales in SCM , LCM , PCM , and LCM . Their expenditures are illegal and consist of wage payments in SPM , bribes in SPM , and purchases of stolen or diverted goods in SPM . First economy producers of producer commodities (PP) receive official income from sales of products to the other two legal industry transactors (PC and LC) and the four government transactors (PA , CA , CK , and CS). Unofficial income is obtained from sales made to SC and SP . The income of PP is spent on official and unofficial wages of

stuff in PPM , protection services in PPM , mandatory regulatory services in PPM , and authorized supplies from PP itself and illegal inputs from SP in PPM .

Each of the four government transactors receives income that is illegal. Illicit funds flow to CS for the provision of unofficial supplies, to CK for false plans, and to CA and PA for protection services. A portion of the illegal income of CS , CK and CA is paid to the higher political authorities (PA) for protection. Naturally, the government transactors also receive official income and make legal purchases of labor, producer commodities, and regulatory services (in the cases of CS , CK and CA).

III. The Development of Models of Disequilibrium and Shortage of CPK's

The definition and description of the second economy of a CPK presented above indicates that it is a complex system of transactors, markets, and exchange relationships. However, the material and diagrams in Part II provide only a framework for the analysis of the second economy systems. They do not offer theoretical explanations of the behavior of transactors or the dynamics of processes such as price adjustment in consumer retail markets. Nor do they enable one to test hypotheses, estimate magnitudes, or assess policies related to the second economy. In order to accomplish these tasks it is necessary to

25 This section is based upon material from Davis and Charnes (Forthcoming (e)).

make use of theoretical and econometric models of the second economy systems in CPAs.

During the past decade a variety of quantitative models of centrally planned economies have been developed. Among these are the theoretical and econometric disequilibrium models and shortage models based upon the ideas of Janos Kornai. These models should have contributed to the analysis of the second economy system, or at least offer the potential for so doing, given that the pervasive illegal private production and sale of goods and services in CPAs, as well as the corruption of government agencies, appear to be closely linked to disequilibrium in consumer and producer commodity markets of the excess demand type and to associated shortages.

The objective of this part of the paper is to introduce the disequilibrium and shortage models of CPAs. Section A provides a brief historical introduction to this topic. It argues that disequilibrium, shortage, and second economy phenomena have been inter-related and of significance in the centrally planned economies throughout their histories. Readers primarily interested in models are advised to skip this material and move straight on to Section B, which surveys the theoretical and econometric foundations of disequilibrium and shortage models. Section C describes the main features of the models and reviews other recent research of relevance to the analysis of disequilibrium in the socialist economies.

A. Disequilibrium, Shortage and the Second Economy in the History of CPAs²⁶

The centrally planned economies of the Soviet Union and Eastern Europe have been afflicted, with varying degrees of intensity, by imbalances in internal and external markets and shortages of goods and services throughout their histories. It is important to appreciate this historical record in order to place in perspective the problems of the socialist economies in the 1980s, to assess current debates in the disequilibrium and shortage model literature, and to understand the close, enduring relationship between shortage/disequilibrium phenomena and the second economy. Unfortunately, a concise disequilibrium oriented history of the socialist economies cannot be presented in this paper due to space constraints and is not yet available elsewhere.

Rather than ignore the issue completely, however, this section presents an introduction to the history of disequilibrium and shortage in CPAs that establishes a foundation for the survey of model developments in Sections B and C.

The first socialist economy developed in the USSR following the October 1917 revolution. During 1918-21 a civil war was fought on Soviet territory that destroyed a substantial share of the productive capacity of an economy already severely strained by World War I and the

²⁶ Section A is a condensed version of an historical survey of dis-

equilibrium, shortage, and the second economy in CPAs presented in the initial draft of this paper. Comments by readers made it clear that a more detailed review was necessary in order to cover properly this complicated topic. It therefore was decided to present only a minimal introduction in this paper and an expanded analysis in Davis (forthcoming (a)).

revolutionary process. To cope with this situation the Bolshevik government adopted the policies of War Communism, which included state ownership of industry and trade, government requisitioning of agricultural products, and administrative allocation of resources. Although this program assisted in the war effort, it also caused hyperinflation, acute shortages of producer and consumer goods, a transition to barter exchange, and extensive black market activity (Malle 1938).

The New Economic Policy (NEP) that governed the Soviet economy in the 1920s resulted in a re-monetization of market transactions, legalization of private business, some restoration of economic balance, and recovery of output to pre-war levels. Despite these achievements, the behavior of markets for producer goods was distorted by imperfect competition resulting from state domination, administrative restrictions on legal private initiative, and bureaucratically-determined prices. By the mid-1920s an excess demand situation developed that generated widespread shortages of producer and consumer commodities (called the 'goods famine') and an expansion of the second economy (Nove 1969).

So the economy often was in a classical unemployment disequilibrium state, with excess demand for goods and excess supply of labour.

During 1924-28 Bolshevik Party leaders and economic specialists engaged in debates on future industrialization, agriculture, and planning policies (Brilich 1960). One faction of the party (later called the right opposition) supported a balanced growth strategy that was linked to a predominantly genetic approach to planning, which

recognized the complexity of inter-relationships in the economy and the importance of devising consistent plans. In contrast, their opponents (the left opposition) argued for accelerated, unbalanced growth. This would have involved a drastic increase in capital accumulation financed by forced savings (primitive socialist accumulation), concentration of investment in heavy industry, expansion of state control in industry and agriculture, subordination of the market to the plan, autarky in foreign trade, and severe constraints on consumption. Adherents of this program believed that planning should have more of a teleological character, which meant it should reflect political objectives and priorities, dominate market forces, and attempt to overcome constraints imposed by existing input-output relationships.²⁷

In the late 1920s Stalin gained control of the Bolshevik Party apparatus and initiated a radical transformation of the Soviet economy. A system of mandatory central planning was introduced and the adopted First Five Year Plan initially expressed in more cautious form the unbalanced growth strategy (Carr and Davies 1969; Zaleski 1971). In 1929-30 the plans were revised in a manner that made them extremely ambitious and generated pervasive shortages throughout the economy. This situation contributed to the decision to collectivize the agricultural sector in order to facilitate the extraction of food and materials needed to support the rapid industrialization drive (Davies 1960, 1968). Within a short period of time these developments

²⁷ See Charnetski and Kirilly (1988) for an assessment of the genetic teleological debate in the context of post-war CMEA country planning.

produced a shift in the disequilibrium regime to one of repressed inflation (or chronic shortage).

The pervasive, chronic disequilibrium in markets and shortages of goods during the first Five Year Plan period were in part caused by conscious policy. In the late twenties and early thirties Stalin and other top Bolshevik leaders (e.g. Mikoyan and Rykov) criticized the 'bourgeois theory' of equilibrium and argued that excess demand in markets acted as a stimulus to industry (Davies, 1988, pp. 165, 465 and 478). For example, at the XVI Party Congress in 1930, Stalin claimed that the repressed inflation disequilibrium state was a positive characteristic of socialism and would facilitate the attainment of party objectives:

'Here in the USSR the growth of consumption (purchasing power) always goes ahead of the growth of production, driving it forward, but over there, with the capitalists, the growth of consumption (purchasing power) of the masses never catches up with the growth of production and always lags behind it, thus condemning production to crises.' (Stalin, 1949, pp. 322-23)

objectives:

Unrealistic assumptions (e.g. concerning growth of labor productivity) and unexpected developments (e.g. the massive destruction of livestock by the peasantry following collectivization) contributed as well to disequilibrium in the Soviet economy.

The Stalinist economic system that emerged in the 1930s institutionalized disequilibrium phenomena. Economic transactors, whether producers or consumers, expected to encounter imbalances and shortages and made appropriate adjustments. Managers in industrial enterprises (transactors IC and EP in the terminology of Part II) learned to behave

in a manner appropriate to their operating conditions, which included inconsistent plans imposed from above, a seller's market for output, an incentive structure that rewarded plan fulfillment in volume terms and inhibited technological innovation, shortages of inputs, supply-linked bottlenecks in production, and non-binding financial constraints. Their responses included a drive to continually increase the quantity of output, neglect of product quality, hoarding of inputs, hiding reserves from central authorities, energetic struggle for more investment and other inputs, diversion of commodities to illegal producer and retail markets, and illegal acquisition of supplies in second economy markets (Granick (1964), Berliner (1967), Zaleski (1971, 1980)).

Households (HO) were confronted by shortages of goods and services in official retail markets and unequal rationing schemes. The second economy compensated to some extent for these deficiencies. Legal collective farm (kolkhoz) markets operated throughout the Stalinist period (Zaleski (1980)). But there were severe restrictions on most forms of private enterprise and repressive policies by control agencies (CA) that inhibited, but did not totally eradicate, the activities of illegal producers of consumer commodities (SC).

World War II gave the Soviet Union a catastrophic shock and resulted in the massive destruction of capital stock, supplies, and population. The Soviet Union was able to respond successfully to the threat to its survival. In the economic realm this involved further centralization of control, establishment of defence production as the highest priority task, reliance on short term physical plans to determine output and allocate resources, imposition of strict labor

discipline, and rationing of consumer goods and services (Zalczyk 1980), Harrison (1985). As a result of these conditions and policies there was turmoil in the economy during the years 1945-46, severe shortages of most goods and services and substantial private trade in food and other scarce consumer commodities.

After the war the more extensive controls that had been imposed on the Soviet economy were relaxed and many of the features of the late 1930s economic system and the old behavioral patterns of planners, managers and workers were reestablished. Due to the pressures of reconstruction and the cold war, investment in consumer goods industries, agriculture, and social services was drastically limited. Attempts were made to bring the population's demand in balance with the modest supplies of consumer goods and services and to reappropriate illegal earnings through measures such as confiscatory currency reform, compulsory bond sales, wage controls, and restraints on social security transfer payments (Nove 1969). This effort was partially successful. However, in the immediate post-Stalin period excess demand increased again in retail markets due to the more rapid growth of the population's income, resulting from reforms of wages and the social security system, than of the supply of consumer goods.

Socialist economies existed in Poland, East Germany, Czechoslovakia, Hungary, Romania and Bulgaria after World War II (the socialist economic system of Yugoslavia is not examined in this paper). Although there was considerable diversity in national cultures, initial levels of development, and the scale of war damage the East European countries adopted fairly uniform economic systems that were derived from

the existing Soviet model of state ownership, central planning, and unbalanced growth. As a result, during the decade 1945-55 the East European economies exhibited advantages and defects that were similar to those of the Soviet economy.²⁸

By the end of the 1960s it was apparent that the traditional centralized approach in promoting rapid development of basic industries, production of high priority goods (e.g. heavy machinery), and extensive growth. But its chronic disequilibrium in markets created numerous problems with respect to efficiency, product quality, and intensive growth. Over the next two decades the socialist countries attempted to define more unique development paths, to reform the planning, supply and management systems (e.g. the USSR in 1957 and 1965, Hungary in 1968), and to realign priorities in favour of consumption.

Although some successes were achieved through these reform efforts, subsequent investigations by both national and foreign experts revealed that up to the mid-eighties they were modest in scale (Schroeder 1979; Hewett 1981; Kornai 1983, 1986b). Throughout 1965-85 industrial, agricultural and foreign trade sectors of the socialist economies were afflicted by chronic shortages of varying degrees of intensity. Most analysts believe that consumer goods markets also were characterized by sustained excess demand (e.g. Nutz 1986), Cherezev (1979). In

²⁸ For example, Kornai's study of planning and management in Hungarian industry in the 1950s described many of the same phenomena that Berliner independently identified in his research on the Soviet factory (Berliner 1957; Kornai 1969). Other parallel characteristics of relevance to this paper were the imbalances and deficits of inputs in the production spheres of the East European economies, chronic shortages in retail markets, and widespread second economy activity.

these conditions, second economy systems of the type described in Part II developed in all CPEs and flourished in Poland, Hungary and the USSR.²⁹

d. Foundations of Modelling Disequilibrium and Shortage in CPAs

Although centrally planned economies were afflicted by imbalances and shortages from their inception, relatively few theoretical or empirical analyses were made of these phenomena before the mid-1950s. Most analysts in the East ignored or minimized the importance of the problem of pervasive disequilibrium. Others followed the Stalinist line discussed above that treated excess demand as a beneficial stimulus to industry. But some insightful studies were made at this time in the West of related topics such as excess demand in retail markets (Dobb 1948), scarcity of investment resources (Grossman 1963), inflation (Bergson 1953), Holzman (1955), and shortages in producer goods markets (Berliner 1952), Granick (1954).

Over the next decade there was an increase in the number of investigations in both socialist and Western countries that focused on or gave prominence to disequilibrium phenomena in CPAs. These primarily concerned specific activities or institutions: planning (Levine 1959), montas (1959), Hunter (1961); industry (Berliner 1957), Kornai (1959), Jasny (1961); monetary system (Holzman 1960); and relations (see Trebil, Kostinsky and Gallik 1973) and Cave and Hare

²⁹ A substantial amount of material concerning the history of the second economies of CPEs from the early 1970s onward is provided in the sources listed in the bibliographies of Grossman (1985, 1987). Numerous studies explicitly link second economy phenomena with chronic disequilibrium in markets and shortages of commodities.

consumption (Pawlowski 1960), Kolupa (1961), Chapman (1963). However, nothing was produced at that time that could be classified as a shortage or disequilibrium model.

During 1965-75 there were important developments in economic theory, econometric modelling, and estimation techniques of relevance to disequilibrium analysis. Among the major theoretical contributions were: Clover (1965), Benassy (1973), and Dreze (1975) on the effective demand concept; Leijonhufvud (1968) and Kornai (1971) on quantity adjustment processes in markets and non-Walrasian equilibrium; Barro and Grossman (1971, 1974) and Benassy (1975) on disequilibrium regimes and the nature of fix-price equilibrium. Major advances were made as well in all components of quantitative economics: computational capabilities, data collection, mathematical modelling, econometric estimation, and hypothesis testing. Fair and Jaffee (1972) developed the first disequilibrium econometric model with the *minimum* condition. In subsequent years further progress in disequilibrium econometrics was made by Amemiya (1974), Goldfeld and Quandt (1975), and Maddala and Nelson (1975).

Despite this innovative research, no serious attempts were made during 1965-75 to adopt disequilibrium approaches to modelling CPAs. In East and West such effort was expended on the creation and application of models of the optimally functioning socialist economy (see the reviews of Kilian 1973 and Sutela 1984) and of input-output relations (see Trebil, Kostinsky and Gallik 1973) and Cave and Hare

³⁰ All Polish, Czechoslovakian and Hungarian language sources mentioned in this paper were examined by W. Charemza, who co-authored Davis and Charemza (forthcoming (a)) upon which this survey in Part III is based.

(1981). In some respects, both of these models have equilibrium orientations. This is true of the former, on an abstract level at least, because it attempts through central planning to determine patterns of resource allocations and production of commodities that will satisfy optimality criteria, which in some circumstances are attainable through equilibrium. The input output model portrays a stable pattern of interdependence between industries, is based on the assumption of fixed-proportions in the production process (which is incompatible with prevalent practices in CPAs of shortage-related forced substitution), and is commonly used to evaluate the consistency of central plans (Baumol 1972, pp. 503-505). The early econometric models of the CPAs also were based on the concepts of the ex ante consistency of plans and the temporary and localized nature of disequilibrium (Shapiro and Hababuk (1976)).

Interesting research of relevance to disequilibrium was carried out at this time in Eastern Europe: Kurnai (1971) made detailed criticisms of concepts of equilibrium and outlined ideas that subsequently evolved into the theory of the shortage economy; Beksiak and Libura (1974) produced theoretical analyses of the causes and consequences of imbalances and deficits of goods in socialist economies; Welfe (1973) discussed the significance of excess demand in econometric models of CPAs; Dyba (1973) made a pioneering, if modestly successful, attempt to formulate a model of consumption markets in a disequilibrium environment; and the impact of the inflationary gap on growth was examined by Beksiak (1966), Klacek and Kiews (1970) and Bajt (1971).

Western empirical work of relevance to disequilibrium in CPAs included

Levine (1966), Bronson and Severin (1970), various articles in Trebil and Hardt (1972), Culbertson and Amacher (1972), Bronson and Severin (1973), Bush (1973), Feshbach and Rapawy (1973), Kataenlinbojen (1975), and Schroeder (1975).

Mainstream research on disequilibrium issues continued to expand the frontiers of analysis in the period 1976-86. Several major studies of the theory of disequilibrium were published such as Barro and Grossman (1976), Malinvaud (1977), and Benassy (1982). Other important theoretical contributions were made by Grandmont (1977), Hahn (1978), Drazen (1982), Silvestre (1985), Cuddington, Johansson and Lofgren (1984), and Laffont (1985). Substantial progress also was achieved in econometric theory, modelling and estimation through the work of Quandt (1978, 1982), Ito (1980), Courteroux, Laffont and Monfort (1980) and Maddala (1986).

C. Models of Disequilibrium and Shortage in CPAs

In the second half of the 1970s the growing instability of the socialist economies, the flourishing of disequilibrium analysis of market economies, and other theoretical developments (e.g. Kornai (1980)) combined to produce a rapid expansion, if not an explosion, of research in both East and West into the modelling and analysis of recurrent imbalances of demand and supply in markets and chronic shortages of commodities and labor in CPAs. The new literature was extensive and diverse in basic approaches, models and analytical techniques. In the interest of simplicity, however, it can be divided

into three categories: (1) shortage economy models; (2) disequilibrium econometric models; (3) other approaches to disequilibrium analysis.

One approach to modelling disequilibrium in CPKs is that based upon the theory of the shortage economy. Following the introduction of the basic model by Kornai (1980) there was considerable elaboration of it by him and others. By the mid-1980s there were over eighty Hungarian and English language studies that used shortage models. The chapters of Davis and Chareaza (Forthcoming (b)) by P. Hare, D. Keane, M. Lecko, and C. Davis provide detailed, critical surveys of their characteristics and applications. Reviews of the book *Economics of Shortage* by Wagner (1982), Levine (1983), and Marress and Mitchell (1984) also contain numerous insights.

In brief, Kornai (1971, 1980) argues that the traditional socialist economy is characterized by non-price control mechanisms, paternalistic relations between superiors and subordinates, largely autonomous behavior of lower level economic units, sellers' markets, soft budget constraints, and shortages of most goods and services (see Hare (forthcoming) for a full discussion of the shortage model). The chronic and pervasive shortage environment affects the activities of all economic transactors in ways that both intensify and reproduce shortage. Kornai believes that the primary cause of disequilibrium in the resource constrained economic system is the quantity-driven behavior of economic institutions, especially in the industrial sector. Prices play only a secondary role in explaining developments in the shortage economy.

The second category is comprised of disequilibrium econometric models of CPKs. These are based on Western theoretical and econometric

approaches discussed above, but adapted to take into account the institutional characteristics and data constraints of the socialist countries. During 1975-86 over sixty studies were produced in this area by economists in the West (USA, Britain and France) and in Eastern Europe (Poland, Hungary and Czechoslovakia). Given the magnitude of this literature, only a selective overview is presented here. Detailed surveys can be found in the chapters of Davis and Chareaza (Forthcoming (b)) by R. Portes, R.M. Quandt, V. Blouhy, W. Welfe, K. Mulyak, I. Grossfeld, W. Chareaza, and J.C. Brada and A.R. King.

The disequilibrium econometric models of CPKs are diverse in nature and can be subdivided into two groups according to their approach: (1) chronic (known) excess demand (or disequilibrium indicator) models and (2) testable excess demand models. The disequilibrium indicator modelling approach assumes the existence of excess demand and seeks to represent it by an observable synthetic indicator. An early application of this idea was made in the West by Green and Higgins (1977) in the consumption block of their econometric model of the Soviet Union. However, most work after that was carried out in Eastern Europe. These models were adapted from Fair and Jaffee (1972) and in their simplest form consisted of supply, demand, and excess demand equations plus the minimum condition. This generated a condensed form model with observable variables that could be estimated using standard econometric techniques. The first example of such a model was Chareaza and Gierusz (1978).

The theory of disequilibrium indicator modelling was simultaneously developed in Welfe (1978) and Chareaza (1981) and applied, for example, by Welfe (1985), Rumaki and Welfe (1986),

The testable excess demand models are derived from the theoretical work of Barro and Grossman (1976) and the econometrics of Maddala and Nelson (1975) and Goldfeld and Gant (1975). As the name suggests, these models make use of demand and supply equations plus the **minimum condition**, but without any assumption concerning excess demand (Quandt (Forthcoming)). The first applications to the analysis of CPBs were made by Portes (1975b, 1979) and by Portes and Winter (1980) in their study of consumption markets in Eastern Europe. In subsequent years Portes and his colleagues refined their econometric models and analyzed a variety of issues in CPBs (Portes et al. (1987) and Portes (Forthcoming)). Several testable excess demand models were also developed and applied in Czechoslovakia (Dlouhy (1981, Forthcoming)). Finally, Burkett (Forthcoming) made a revision of the disequilibrium model by replacing the **minimum condition** with the assumption that the quantity transacted is lower than the minimum of demand and supply, even in an excess demand environment, due to the existence of unavailable supplies (**slack**).

The disequilibrium econometric model by Howard (1976b, 1979) of consumption and labor markets in the USSR is difficult to categorize. On the one hand, it is derived from Barro and Grossman (1976) and therefore has properties similar to those in the testable excess demand group. On the other hand, it assumes excess demand in official retail markets and examines the spillover effects in the collective farm market. Taking these various factors into account it probably makes most sense to include it with the chronic excess demand econometric

The third group includes theoretical or econometric investigations of disequilibrium and shortage phenomena of CPBs that do not clearly fall into the shortage or disequilibrium modelling categories. Given the residual nature of this definition, it should not be expected that the approaches adopted by these scholars are uniform. Indeed, most of these contributions are highly original, although they often complement work being carried out on the shortage and disequilibrium models discussed above.

Most Western theoretical models of CPBs are derived from neoclassical concepts of general equilibrium. Over the past decade a number of studies have been made of the equilibrium properties of a CPB that includes official markets characterized by fixed prices and chronic disequilibrium and flexible private markets. Examples are Krugman (1983, 1984), Stahl and Alexeev (1985), Wellisz and Findley (1986), and Katz and Owen (1987). Section IV.A presents detailed surveys of four of these models.

Soviet economists have paid more attention to the modelling of disequilibrium in CPBs since the early 1970s. Articles of high theoretical standards were produced by Braverman (1972), Polterovich (1980, 1982, 1983, 1986) and Movshovich (1988). Braverman and Levin (1981) wrote the first Soviet book on disequilibrium models, which was mathematical in nature. Other theoretical contributions were made in Czechoslovakia by Toma (1983), who employed a disequilibrium approach and the labor theory of value to explain price formation when supply and

demand are out of balance. These models are not examined in this paper due to their abstract characters and neglect of the second economy. Several scholars made contributions through their criticism of the shortage model. Soos (1984) and Gomulka (1985) criticized J. Kornai's concepts of firm behavior and the soft budget constraint and offered alternative explanations for the origins and reproduction of shortage, respectively the structural inelasticity of supply and the differential between budget softness and price flexibility. Their critiques were extended by the Romanian scholar Dascalu (1987) in his notable survey of disequilibrium and shortage theory.

Other investigations identified the investment process as a major source of disequilibrium in CPBs. Bauer (1978, 1981) offered numerous insights into the causes and consequences of investment cycles in socialist economies. Additional important disequilibrium-related examinations of investment were Soos (1976), Simon (1980), Winicki (1982), and Podkaminer (1985). The role played by central authorities and planners in the generation of disequilibrium in socialist economies was examined by a number of specialists. Kilian (1979) provided a comprehensive, comparative assessment of the contribution of economic planning deficiencies to imbalances and instability in CPBs and Podkaminer (1986b) analysed planners' responsibility for causing disequilibrium by establishing incorrect relative prices and for exacerbating their effects through inappropriate policies. In the case of consumption, Collier (1985, 1986) estimated the gap between notional and effective purchasing power of households in a quantity-constrained economy (the GDR).

Issues of inflation (open, hidden and repressed) and its relationship to market imbalances were thoroughly analyzed in the period after 1975 by Howard (1976a), Pickersgill (1977), Adams (1979), Nutt (1982), Pindak (1983), Brus and Laski (1985), Colijn (1985), Nutt (1986), and Herer and Sedulski (1988). The latter four studies examined the relationship between suppressed inflation in official retail markets and spillover activity in the private sector. Numerous investigations were made of the second economics in CPBs, which were shown to be substantial in scale and expressions of disequilibrium in retail and producer commodity markets (see the bibliographies of Grossman (1985, 1987) and Parts II, IV, and V of this paper).

IV. The Second Economy in Disequilibrium Models

Over the past decade the analysis of the second economy system of the centrally planned economy has been advanced through the development and utilization of theoretical and econometric models derived from neoclassical and Keynesian economics.³¹ A sub-set of these is comprised of models that explicitly examine disequilibrium phenomena in consumer and producer commodity markets and their relationship with private activities. This part of the paper assesses the contributions of these disequilibrium models.

³¹ For clarification of the terms 'neoclassical' and 'Keynesian economics' see Pearce (1986, pp. 229, 297-300).

The survey is wide in scope and includes most types of disequilibrium models.³² Section A reviews a number of general equilibrium models of CPBs which assess the effects of chronic imbalances in official markets on private sector activity. Section B examines several econometric studies by Richard Portes and his colleagues and evaluates the influences on their findings of the exclusion from their macroeconomic disequilibrium models of the second economy. This is followed in Section C by a survey of microeconomic disequilibrium economic models that incorporate a private market. Finally, an evaluation is made of Charemza's macroeconomic model of the consumption sector in Poland, which combines disequilibrium and second economy analysis.

As noted in the introduction, the objective of this paper is not to compile a series of abstracts of models, but to conduct a comparative evaluation of them using the system description of the second economy presented in Part II. Accordingly, when examining the disequilibrium models attempts are made to identify their coverage of the transactors and the quantity and financial flows of Diagrams 1 and 2, as well as to make more conventional assessments of their features and contributions. This methodological approach is sometimes normative in the sense it

³² It was originally intended to have a fifth section on 'Repressed inflation and the second economy' that would have reviewed the four related non econometric, macroeconomic, monetary oriented models of Brus and Laski (1985), Collin (1986), Nuti (1986), and Herer and Sadowski (1988). Due to time and space constraints it was not possible to prepare this. But readers should examine these studies, which assess the role of the second economy in dealing with demand spillover from official retail markets in disequilibrium. Differing conclusions are reached concerning the effectiveness of the second economy in equilibrating consumption markets.

the sense that it criticizes a model for not covering transactors or markets that this author considers to be of relevance. However, its main purpose is to identify the pattern of research, outstanding debates, and unexplored issues in disequilibrium studies.

A. General Equilibrium Models with a Second Economy

Most Western theoretical models of CPBs are derived from neoclassical concepts of general equilibrium in a competitive market economy (Cave and Hare (1981)). It therefore is to be expected that this approach has influenced the formal analysis of the second economy. This section surveys four models that examine the implications of private activity in CPBs characterized by chronic disequilibrium in official markets.

The earliest of these equilibrium models are those of Bruson (1983, 1984). He focuses the analysis on inter-firm markets for capital and intermediate goods (CM), which is unusual in that most other studies are of consumer goods markets. The transactors in his models are first economy producers of consumer commodities (PC), first economy producers of producer commodities (PP), illegal producers and distributors of producer commodities (SP), and the central authorities (an amalgam of PA, CA, CR and CS). Trade between firms takes place in FCCM (capital and intermediate goods market of first economy producer of consumer commodities), FPCM (capital and intermediate goods market of first economy producers of producer commodities), and SCPM (capital and intermediate goods market of second economy producers of producer

commodities). There also are, at least implicitly, labor markets (L^M) and protection services markets (P^M). Although Kricson (1983, pp. 115-116) recognizes the importance of quantity flows of goods and services and barter transactions, his model is primarily concerned with financial flows and exchanges occur on a cash basis.

Kricson assumes that initial allocations of inputs to firms are inconsistent with planned output, plans usually are taut, and managers have bonus incentives to trade in the second economy in order to obtain the inputs necessary to achieve official output targets. In his model there is 'leakage' of cash from enterprise bank money to pay staff for their private initiatives (wage payments in labor market) and higher officials for protection (bribes in protection services market). Central authorities tolerate firms' illegal activities because of their beneficial effects for the economy. One important finding is that second economy trade in intermediate goods results in a 'bribes equilibrium' that is a Pareto improvement on what would have been achieved with the initial allocation of inputs (Kricson (1983, pg. 118)).³³

A second theoretical model is that of Stahl and Alexeev (1985), which is used to examine the existence and properties of equilibria in CPBs with and without private markets (or black markets in their terminology). In contrast with Kricson's model, this one concentrates on consumers and retail markets. The transactors are households (HO) and the government (an amalgam of first economy producers of consumer commodities (FC) and the central economic authorities (CE)). The

markets examined are the official retail market (FM) and the illegal retail market (SIM). There is no illegal production of consumer commodities for SIM , only re-trading of official goods acquired in FM . However, the households that sell goods in the black market could be interpreted as transactors SC (illegal producers of consumer commodities). The model does not deal with production or trade in producer goods or bribery of government agencies by industry transactors.

The CPR of Stahl and Alexeev has the following general features.³⁴ The government fixes prices (p_i) in official markets and controls all supplies of consumer goods (\bar{x}_i). Prices in the state market are non-Walrasian, which means there are shortages and surpluses. In the case of goods in deficit, distribution in the official retail market is made with the help of a rationing scheme. Their model only considers rationing through queues that are stationary and deterministic.³⁵ The amount of queuing time (τ) per unit of good purchased is a uniform constant for all consumers. Households ($i = 1, \dots, N$) have exogenously determined endowments of money (M) and non-work time (L), where L is the sum of queuing time ($\tau \cdot \bar{x}_i$) plus leisure time (θ). The procurement of commodities requires expenditures of both money and time. Consumer i therefore has a financial budget constraint ($P_1 \cdot x_i + M^i$) and a time budget constraint ($\tau \cdot x_i + \theta_i + L^i$). The household's utility is a function of x_i and θ_i and demand is dependent on τ^i and p_i . Finally,

³⁴ The model of Stahl and Alexeev (1985) is based on or related to previous rationing or queuing studies such as Barzel (1974), Kornai and Weibull (1978), Dreze and Mueller (1980), Neary and Roberts (1980), Polterovich (1982), Lindsey and Feigenbaum (1984), and Deacon and Sonstelie (1985).

³⁵ Stahl and Alexeev (1985, pp. 236-37) make a number of interesting comments on the features and equilibrium properties of Kricson's model.

Individuals have unequal marginal rates of substitution of time for goods.

The first case considered is that of a CPG with only an official retail market and non-Walrasian prices. Stahl and Alexeev define equilibrium to be a vector of queue times (τ^i) and distribution of goods (x^i) such that demand does not exceed supply. They show that in varying conditions of the monetary budget constraint equilibria exist. If there is no excess supply of money ($\bar{M} \leq p_1 \cdot \bar{x}$), then an equilibrium exists with at least one unrationed commodity. Other findings are that the queue equilibrium is less efficient than a coupon rationing equilibrium of the type discussed in Dreze and Mueller (1980) and is queue-inefficient in that the differing marginal rates of substitution of goods for time imply that there are potential gains from trade.

The second case is of a CPG with the same features plus a black market. There is no special second economy production in their model. Instead, private re-trading of goods acquired in the official retail market (IRM) takes place in a black market (e.g. SHM) that operates costlessly (i.e. no queues or search costs) and has uniform prices (p_2) for all consumers. Due to the differing marginal rates of substitution of time for goods, some households are prepared to queue in the official market to obtain goods for re-sale at higher prices in the black market to other households having higher valuations of time. The trade of consumer i in the black market is v_i . The difference between the black market price (p_2) and the official price (p_1) is the potential gain from waiting in a queue and reselling, which is the product of queue time (τ) and an implicit wage rate (w). The household problem is to maximize

the utility function $u(x^i, \tau^i)$ subject to what Stahl and Alexeev call a 'pseudo-budget constraint':

$$(p_1 + w\tau) \cdot x^i + w\theta^i \leq M + wL^i,$$

which is an innovative combination into one expression of the money and time constraints. A demand function constrained not only by prices and quantities but also by queuing time is derived from this.

Their theoretical analysis of this second economy model indicates that equilibria exist consisting of a queue time τ^* , an implicit wage rate w^* , and an allocation (x^*, θ^*, τ^*) for all i that implies black market clearing and no excess demand on official markets. If there is no excess supply of money (i.e. $M < p_1 \cdot \bar{x}$) then at least one equilibrium exists with an unrationed commodity. They show that equilibrium in a CPG with a black market does not necessarily represent a Pareto improvement over an equilibrium in a system with only official markets. In fact, the majority of individuals can be worse off as the result of second economy redistribution. One additional finding is that it is not always possible for those who gain from private re-trading of goods to compensate losers and thereby obtain an allocation that is Pareto superior to that of an equilibrium without a black market.

Another equilibrium model with a second economy is that of Wellisz and Findley (1986). They assume that planners (CK) have a strong preference for heavy industry products, whereas households (HO) prefer light industry goods. Since the official economy is responsive to the authorities' commands, an output mix is chosen that generates shortages of consumer goods. The chronic excess demand in the official retail market (IRM) stimulates the output of consumer commodities by the

illegal producers of consumer commodities (SC) for sale in illegal retail markets (SM). Labor is stolen from first economy industry transactors (FC and FP) and supplied to illegal producers (SC and SP) to accomplish this. In their model equilibrium is achieved when the market demand for consumer commodities is equal to the sum of legal supplies in FIM and illegal supplies in SM.

As is evident, this model has broader coverage than those of Krichen and Stahl/Alexeev in that it considers at least superficially the transactors households (HO), first economy producers of consumer commodities (FC), illegal producers of consumer commodities (SC), first economy producers of producer commodities (FP), and central economic authorities (CA) as well as the illegal retail market (SM), the official retail market (FIM) and labor markets (LM). They also briefly discuss the role of control authorities (CA) and the factors that influence the toughness of their regulation of private activities. However, bribery and the protection services markets are not examined.

The paper of Katz and Owen (1987) presents a fourth equilibrium analysis of the second economy in a GPK.³⁵ Their model is similar to that of Stahl and Alexeev (1985) in its focus on consumer retail markets and use of queuing theory. The differences include a stochastic treatment of queuing, a clear distinction between consumer industries and planners, and an analysis of managers' behavior.

The Katz and Owen model explicitly includes three transactors: households (HO), first economy producers of consumer commodities (FC), and planners (or central economic authorities (CE)). It also could be

³⁵ This disequilibrium model is related to an earlier, more limited queuing model presented in Katz and Owen (1984).

interpreted to contain implicitly illegal producers of consumer commodities (SC) in the sense that this transactor illegally sells to households goods officially produced by FC. Transactions in the model take place in the one-good official retail market (FIM) and the illegal retail market (SM). The planners establish official output target for industrial enterprises (thereby determining release rates of the good onto the official retail market), allocate inputs, set the price of the consumer good, and construct the managerial bonus function. It is assumed that excess demand exists in the official retail market at the fixed price and a flexible price second economy market exists for the same good. Utility maximizing consumers can elect to queue for the good in the official retail market with a known low price but uncertain waiting time or purchase the good immediately at a higher price in the illegal retail market. Managers can utilize the allocated inputs to produce identical goods for the official and the illegal retail markets. Their decision concerning distribution of output is determined by maximizing utility that is a function of official bonuses and illegal revenue. The black market price is uncertain, reflecting the variability of both market conditions and central tolerance of the existence of the second economy. Katz and Owen show that their model generates an equilibrium solution that determines the black market clearing price and the quantity of second economy output. In equilibrium there is consistency of consumers' ex ante probabilistic assessments of waiting time with actual ex post queuing experience and of managers' expectations concerning the price they will receive for sales on the second economy with the the actual equilibrium price. A

related welfare result is that the second economy increases the aggregate utility of both consumers and managers. Hatz and Owen have produced an interesting theoretical queuing model of a CPS with disequilibrium in official markets and a price flexible private market. It should be recognized, though, that it covers only a component of the second economy system. It does not examine household behavior in labor markets and the following transactors: legal private producers of consumer commodities (LC), illegal producers of producer commodities (SP), first economy producers of producer commodities (PP), central supply agencies (CS), and political authorities (PA). Although the authors recognize the importance of the regulatory services of control agencies (CA) in affecting the second economy market conditions and managerial decision making, no attempt is made to show how bribes paid by the manager for the purchase of protection services can influence control agencies' behavior. Furthermore, the illegal inter-firm transactions analyzed by Ericson (1983, 1984) are not treated.

B. The Portes Macroeconomic Disease: The Economic Models and the Second Economy

The Macroeconomic disease of CPS economic models of CPS produced by Richard Portes and his colleagues contain novel concepts and generate interesting empirical results that challenge conventional opinions (Portes (1978b, 1979, forthcoming), Portes and Winter (1977, 1980) and Portes, Quandt, Winter and Yeo (1987)). They do not, however,

explicitly consider the second economy system in either model formulation or analysis of issues. This section assesses the effects of these limitations on the adequacy of the structure of the Portes disequilibrium econometric models and on findings concerning the existence of excess demand in retail markets and labor supply responses to shortages in CPSs.

With respect to structure, the Portes models are quite simple and contain only two transactors: consumers and planners. In the terminology of Part II of this paper, the former is equivalent to households (HO) whereas the latter is an aggregation of first economy producers of consumer commodities (NC), first economy producers of producer commodities (PP), central supply agencies (CS), control agencies (CA), central economic authorities (CB), and political authorities (PA). Furthermore, in the basic closed model only two highly aggregated markets are depicted: a labor market that is the equivalent of the seven legal ones shown in Diagrams 1 and 2 and an official retail market (FIM). All legal and illegal private transactors (LC, SC, SP), markets (LPM, SHM, HEM), and flows (e.g. from FC to SC) are excluded from consideration, as are legal and illegal inter-industry exchanges. The modellers also are primarily interested in monetary variables, such as consumer demand, wages, prices, and savings (e.g. those related to Diagram 2), rather than quantity transactions and flows (e.g. those of Diagram 1).

Portes and his co-authors suggest that their simplified models portray the basic relationships in the socialist economy and are appropriate tools for the analysis of important transaction processes

and issues. For example, they consider it possible to understand labor and consumer retail market behavior without taking second economy processes into account. This is a debatable point. Empirical studies cited in this paper suggest that legal and illegal private transactions are of considerable importance to households as both consumers and suppliers of labor.

In the case of the highly aggregated representation of the production (industry) and control (government) components of the economy, Portes (forthcoming) states that:

'For our purposes, however, I see little advantage in breaking up the state productive sector into planners and enterprises and modelling the interaction between them. This is clearly essential in modelling investment behavior, but not for the consumption goods market'.

This argument appears to be of questionable merit in light of the substantial contradictory theoretical and empirical evidence. Differentiation of enterprises and planners would be helpful in the first place in analyzing the not in substantial flows of goods and services from first economy producers of consumer and producer commodities (FC and FP) to the excluded legal private and illegal producers of consumer commodities (LC and SC) and to illegal producers of producer commodities (SP), which are contrary, at least officially, to the wishes of the central economic authorities (CE) and political authorities (PA). A similar situation exists with respect to inter-industry trade. Numerous studies by Berliner (1952, 1957), Felli (1977), and Ericson (1983, 1984) have shown that illegal trade between producer establishments (e.g. industrial enterprises) is of crucial

importance to their ability to fulfill inconsistent plans imposed from above. Given this and the variability in the intensity of illegal activity in the production sphere, one wonders about the validity of a hypothesized relationship between plan instructions and the official output of consumer commodities that ignores the second economy.

Another drawback to the government-industry consolidation in the Portes models is that it obscures the operation of the protection services markets (PM). In Part II of this paper it was argued that the second economy provides substantial quantities of goods and services directly to consumers, either from SC (illegal producer of consumer commodities) to the illegal retail market (SM) or from LC (legal private producer of consumer commodities) to the legal private retail market (LM). In addition the transactor SP (illegal producer of producer commodities) supports the operations of producers of consumer commodities (FC, LC, and SC). Bribes are paid by industrial transactors of all types to obtain protection services from control agencies (CA), false plans from central economic authorities (CE), and unofficial supplies from central supply agencies (CS). Given this, the neglect in the Portes models of transactions between industry and government in the protection services market make it difficult to assess real development in consumption goods markets in socialist economies.

The findings of Portes and co-authors regarding excess demand in the official market for consumer goods and services (FM) also have proved to be controversial. In the Portes and Winter (1980, pp. 149, 155-56) study of Czechoslovakia, the GDR, Hungary and Poland up to the mid 1970s the authors state that:

... we believe that the evidence ... clearly justifies rejecting the hypothesis of sustained repressed inflation in the market for consumption goods and services since the mid 1950s in our four CPBs.

Certain critics have misinterpreted the Portes/Winter arguments either by asserting that they implied there never was excess demand in consumption markets or that their findings applied to later periods when there is strong, contradictory evidence of repressed inflation. Nevertheless, even a correct, limited interpretation appears to be in conflict with the results of numerous studies which argue that chronic shortages of consumer and producer commodities are wide-spread in least European countries.³⁶

Study of the second economy may help to resolve this debate in two ways. First, the existence of a robust, well-developed illegal private sector in a CPS could be interpreted as indirect evidence of sustained excess demand in official retail markets. However, one would have to be careful in making such a linkage to distinguish the effects on second economy development of market disequilibrium, tax avoidance, and government policy. Second, it could help clarify whether excess demand in official retail markets (IRM) spills over into, and is absorbed by, private markets (LSD and SMD). If so, this would make it difficult to assess the existence of chronic consumer excess demand using only data from official market. The study of Chareza (forthcoming) discussed below includes a few economy markets in a macro-

³⁶ Among the many studies that argue chronic shortages of consumer and producer commodities have existed in Eastern Europe are Kurnat (1969, 1971, 1980), Bauer (1978-1981), Eltman (1979), Galor and Galasi (1981), Witecki (1982), Gold (1984), Galaz (1985), Keme and Witecki (1985), Kazer (1986), Mutu (1986), Podkaminer (1986b), and Chareza (Forthcoming).

economic disequilibrium econometric model of the consumption sphere in Poland. This enables him to analyze retail market equilibrium more comprehensively than Portes and co-authors. On the basis of his empirical analysis, Chareza finds that there was sustained excess demand in the official retail market in Poland for the years 1970-75, which contradicts the equivalent conclusions from the Portes studies. Other disputes related to Portes' modelling work have arisen over the issue of the supply multiplier in CPBs. Barro and Grossman (1974) introduced this concept in their theoretical analysis of the behavior of firms and households in a disequilibrium state of suppressed inflation, which means that at existing wages and prices the aggregate demands for consumer goods and labor services exceed corresponding aggregate supplies. They argue, in brief, that tightening of constraints on household consumption (i.e. intensification of excess demand in retail markets) initiates a cycle of reduced labor supply - lower output by firms - even lower consumption - greater restriction in labor supply, etc. The final impact of an initial reduction in consumption on employment and output can be calculated using a supply multiplier, which is the reciprocal of one minus the marginal propensity to work.³⁷

³⁷ Barro and Grossman (1974) begin by analyzing a situation of market equilibrium and derive the firm's national supply of consumer goods and labor demand equations through constrained profit maximization and the household's national demand for consumption, labor supply, and saving function through inter-temporal constrained maximization of its utility function. They then assume the price level and nominal wage rate are set too low and generate a suppressed inflation state. Firms are not constrained on the output side given the excess demand environment but because quantity takers with respect to employment, purchases of labor services are less than national demand, which in turn means that the

A full analysis of the supply multiplier in the CPE is not carried out in the Portes model studies, nor are detailed discussions of labor supply responses presented. Nevertheless, Portes (forthcoming) argues, with numerous qualifications, that one could expect to observe in CPEs both the labor supply responses and supply multiplier effects outlined by Barro and Grossman (1974):

'Excess demand for consumption goods should have a spillover effect in reducing effective (quality-corrected) labor supply, and hence output; this is the basis of the "supply multiplier".'

Furthermore in Portes (1978b, 1979) labor supply functions are specified that have properties similar to those developed in the Barro and Grossman (1974) suppressed inflation case.

Debate has developed recently concerning the validity of the concept of the supply multiplier in CPEs and the nature of labor supply

actual output of goods is below the desired level. In the case of households, the actual consumption of goods becomes supply determined and falls below notional demand. The household therefore can either save the income it planned to spend or substitute leisure for the unattainable current consumption by reducing labor supply. Barro and Grossman (1974, pp. 93-97, 103) show that utility maximization subject to the quantity constraint in the consumption market yields new functions of effective demand, labor supply, and savings. The effective supply of labor is less than notional and is determined by the real wage rate (as before), the length of the constrained period, and real money balances reduced by obtainable total consumption during the constrained years. In contrast, current period savings grows in the face of excess demand in consumer markets in order to pay for an increase in planned consumption during anticipated unconstrained future periods. Barro and Grossman (1974, pp. 98-99) argue that in this supply-constrained system a reduction in household consumption opportunity sets in motion a cycle of reduced labor supply leading to lower output by firms causing even lower consumption and labor supply. The final change in employment is a product of the effect of the initial shock and the supply multiplier. From this, the final impact of the exogenous disturbance on output can be determined.

responses to excess demand in consumption markets (e.g. Hare (1987)). Nuti (1986, pp. 80-69) argues that the existence of second economy markets (SEM) that absorb spillover excess demand from official retail markets (IRM) means that:

'... the consumer rationing model à la Barro and H. Grossman is not at all suitable for Soviet type economies ... While Barro and H. Grossman specifically stress their assumption that there is no secondary trading in a two-tier market, and do not claim their results apply outside the model's assumptions, Howard's use of that Model [CMD Note: Howard (1979)], in spite of his recognition of 'the uncontrolled or free consumer goods market' (which, moreover, is restricted to the kolkhozian market) is illegitimate. The same consideration applies to Portes' theoretical ... and empirical work ... Consumers are indeed quantity rationed in the state sector but they are not subject individually to overall quantity constraints since they can always spend their money in secondary markets. It follows that the 'supply multiplier', i.e. the rounds of reduction in labor supply (and therefore consumer goods supply) which are alleged as a consequence of quantity constraints, do not necessarily occur ...'

In the remainder of this section an attempt is made to clarify the meaning of the labor supply response in existing Portes models and then to outline how the introduction of a second economy could complicate the interpretation of this relationship. It is argued that an increase in excess demand in the official retail market can evoke three different total labor supply responses depending upon conditions in the second economy: (1) no change, (2) increase, and (3) decrease. Assume the CPE under study has a second economy system of the type described in Part II (Diagrams 1 and 2) with the simplification that the private legal and illegal retail markets (LM and SM) are combined into SEM and private legal and illegal producers of consumer commodities (LC and SC) are merged into SC. The first economy is comprised of the industry transactors FC (first economy producers of consumer

commodities) and P^P (first economy producers of producer commodities) and the government service transactors PA (political authorities), CA (control agencies), CG (central economic authorities), and CS (central supply agency). The second economy is comprised of SC and SP (illegal producers of producer commodities).

Excess demand in the official retail market (P^R) at fixed state price P_1 is the condition

$$e_1 = C^d - C^a > 0$$

where e_1 = excess demand in official retail markets
 C^d = national consumption demand

C^a = actual consumption, which is equivalent to supply (or effective consumption demand in the constrained period (Barro and Grossman 1974)).

Deficit commodities can be purchased in the illegal retail market (S^R) at the higher black market price P^B .

Total labor supply (Ψ^S) is the sum of labor supplies in the first economy (Ψ^1) and the second economy (Ψ^2). Households receive wages w_1 in the first economy and w_2 in the second economy. In an excess demand environment the household's labor supply function has features similar to those described in Barro and Grossman (1974).³⁶ For simplicity of presentation the net effects on labor supply of consumption-constrained

³⁶ Barro and Grossman (1974, pp. 94-97) argue that in a suppressed inflation state labor supply is a function of net non wage resources (holdings of real money balances plus lifetime receipts of profits minus total consumption during constrained period), the expected length of the constrained period, and real wages. Portes (1979, p. 330) specifies labor supply in conditions of excess consumption demand as a function of real wages, initial real money balances, and consumption.

wealth and length of the constrained period are excess demand indicator e_1 . So labor supply in both first and second economies is a function of real wages and excess demand in official retail markets:

$$\Psi^1 = \Psi(w_1, e_1)$$

$$\Psi^2 = \Psi(w_2, e_1)$$

$$\Psi^S = \Psi^1 + \Psi^2$$

$$\frac{\partial \Psi^1}{\partial w_1} > 0, \quad \frac{\partial \Psi^2}{\partial w_2} > 0$$

The first derivative of Ψ^1 , Ψ^2 , and Ψ^S with respect to e_1 are to be determined.

At this stage several measurement problems should be noted. Official statistics measure only the apparent labor supply in the first economy (Ψ^1). As a general rule, Ψ^1 is greater than the actual Ψ^1 because it includes some time devoted to on-the-job leisure, household production, and second economy activity (Miles (1982, p. 124)). A related difficulty is that of measuring Ψ^2 , which is comprised of stolen first economy labor time, moonlighting by first economy workers, efforts by legal private sector employees, and unreported work of pensioners. It is not possible to obtain comprehensive, reliable official statistics on Ψ^2 in CG's and estimates, although better than nothing, have a high degree of uncertainty.

One final assumption is that the households should regard the constraint on consumption as long term. Barro and Grossman (1974, p. 36) point out that in the case of a constraint perceived as transitory the household will increase savings by about as much as the consumption

deficit and not significantly reduce labor supply.

The structure of a CPR model exerts a major influence on the interpretation of the labor supply response to shortages of consumer commodities. As mentioned above, the Portes models do not contain a second economy. They appear to assume that $\theta_2 = 0$, so $g^s = g^s_1$ and to discuss the response of g^s to excess demand (e_1) in official retail markets. Since households can only spend their wages on consumer goods, or save in these simple models, Portes reaches the conclusion, consistent with Barro and Grossman (1974), that their effective consumption demand will equal supply, effective saving will be higher than nominal to finance anticipated consumption in a future unconstrained period, and effective labor supply will be lower than nominal as leisure is substituted for work-time in the constrained period. This reasoning lies behind Portes' argument that first economy labor supply declines in response to growth in excess demand:

$$\frac{\partial g^s}{\partial e_1} < 0$$

Given the features of these models (e.g. $\theta_2 = 0$), this is equivalent to total economy labor supply (g^s) being reduced in response to shortages, that is

$$\frac{\partial g^s}{\partial e_1} < 0$$

However, in the discussion below it is assumed that Portes' comments refer to the first economy response rather than the total economy one. If a private sector is introduced into a model of a CPR then the labor response becomes more uncertain and depends upon assumptions

concerning the characteristics and operations of the second economy. A first case can be described in which an increase in e_1 causes no change in total labor supply (g^s) but a decrease in g^s_1 and increase in g^s_2 . The reasoning behind this is as follows. Although the household is quantity-constrained in SHM it can bring its consumption up to desired levels through purchases in SHM . However, higher prices must be paid for commodities obtained from the private sector. Nuti (1986) argues that this will raise transaction and speculative demand for money, ensure that money retains its incentive value even with excess demand in SHM , and mute any reduction in labor supply. Expressed somewhat differently, the increased volume of transactions in SHM will cause an increase in the weighted average price level thereby reducing real money balances and stimulating efforts to earn more money.

The labor supply response is directly influenced by opportunities in the second economy, which requires labor services to support the activities of transactors SC and SP. Diagram 1 (Fig. 30) shows that households supply labor to both first economy and private transactors, a point that also has been made by Hare (1987). Earnings per unit time are higher in the private sector than in state enterprises. Assume that labor discipline is slack, private employment opportunities are good, and the desire to earn more money causes employees to steal work time from the first economy (g^s_1) and divert it to second economy activities (g^s_2). Even with a constant overall labor supply ($g^s_t = g^s_{t-1} + g^s_2 = g^s_1$), this would result in an increase in average real wages from period $t-1$ to t :

$$w_t = w_{1t} \left[\frac{g_{1t}}{g_{1t} + g_{2t}} \right] + w_{2t} \left[\frac{g_{2t}}{g_{1t} + g_{2t}} \right] > w_{t-1}$$

The labor supply responses in this case would be:

$$\frac{\partial g^s}{\partial e_1} = 0$$

$$\frac{\partial g_1}{\partial e_1} < 0$$

$$\frac{\partial g_2}{\partial e_1} > 0$$

These results indicate that part of the dispute between Portes (1974b, 1979, forthcoming) and Nuti (1986) may be based upon misinterpretations of positions. If Porte is discussing an accurately measured first economy labor response (g^s_1) to e_1 rather than total economy labor response (g^s), as seems likely given the nature of his models, then his argument is consistent with the results of this first case. On the other hand, it also supports Nuti, who suggests that increased shortages in consumption markets will elicit a positive second economy labor response (g^s_2) but will have a net negative impact on the total labor supply (g^s).

A second case can be outlined that shows labor supply of all types (g^s, g^s_1, g^s_2) increasing in response to intensification of excess demand. Assume as before that the change of e_1 in FIM results in a spillover of demand in SME and a heightened household interest in raising income. In this case, though, there are barriers to entry in the

second economy confronting potential entrepreneurs (e.g. Georgians control the flower market and prevent Russians from starting up business), supply constraints hold down the output of illegal transactors SC and SP, and not all households have marketable second economy labor skills. Thus, private employment opportunities are limited. Furthermore, managers more effectively control their enterprises so there are administrative obstacles to the diversion of first economy labor. Despite these conditions, there is some increase in g^s_2 . Those who cannot earn more through private activities decide to accomplish this by providing additional labor services to their state enterprises, for example by working overtime. Since firms are quantity takers with respect to employment, they accept any offers of additional labor. If the increments to g^s_1 from extra legal effort are greater than the sum of additional thefts of time for second economy supply (g^s_2) then the total labor supply g^s goes up.

In these circumstances the labor supply responses to increased excess demand in FIM are:

$$\frac{\partial g^s}{\partial e_1} > 0$$

$$\frac{\partial g^s}{\partial e_1} > 0$$

$$\frac{\partial g^s}{\partial e_1} > 0$$

Such behavior would be inconsistent with that hypothesized by Portes (forthcoming).

The third case is of a CPG with a second economy in which an increase in α_1 causes declines in g_1 , g_2 , and g_{S} . As before, nominal consumption demands are not satisfied to an increasing degree in PFM and households attempt to compensate through private earnings and purchases. Unfortunately for them, there has been a leadership succession and a resulting change in the attitude of the political authorities (PA) to the second economy (e.g. the shift from the Brezhnev to Andropov regimes in the USSR). The PA instigates a purge of the control agencies (CA), central economic authorities (CE), and central supply agencies (CS) that removes many corrupt officials and raises the risk of detection and punishment of the remainder so high that most temporarily suspend provision of protection services while awaiting the outcome of the political struggle at the top. For example, they might be assessing the issue of whether Chernenko or Gorbachev will succeed a strict but aging Andropov. Orders are given to government agencies that result in an intensification of efforts to suppress lower level illegal private economic activity, decrease the diversion of capital and intermediate goods to SP and SC, and tighten controls on the labor force. This process corresponds to an administrative imposition of quantity rationing on producers of second economy commodities. In the case under consideration it causes the temporary breakdown of the protection services market and new controls on needed commodity inputs, which make it extremely difficult for private transactors to cope with the situation by increasing bribes and input purchase price offers.

thereby merely shifting second economy supply curves up and to the left (e.g. smaller quantities supplied at higher prices).

Another obstacle to second economy adjustment to the new conditions is the existence of the informal societal norms mentioned above (see pg. 43), that establish private price ceilings. If prices are raised beyond these informal limits the risk of denunciation of illegal traders to the CA by the public grows unacceptably high. Although these norms do change over time in response to market conditions, it is assumed in this case they are sticky, perhaps because the political succession has been accompanied by effective moralistic propaganda that makes transactors offering scarce goods at economically justifiable high prices appear as speculators to a significant segment of the population.

In this not entirely implausible situation the second economy transactor SC cannot maintain output, let alone raise it in response to increased demand spilling over into SPN from FIM. As a result, households are confronted by two different quantity-constrained retail markets that are unable to satisfy notional demand of consumers. Their first economy labor supply (g_1) declines in a manner consistent with the behavior described in Barro and Grossman (1974), as they substitute leisure for work-time.³⁹ Furthermore, the drop in second economy

³⁹ Wiles (1982, pg. 124) points out that in an excess demand situation households divert more official work time to searching and queuing for deficit goods, 'without much increasing it in the Second Economy'. In the terminology of this paper such behavior corresponds to labor responses $\frac{\partial g_1}{\partial \alpha_1} < 0$, $\frac{\partial g_2}{\partial \alpha_1} < 0$, $\frac{\partial g_{\text{S}}}{\partial \alpha_1} < 0$.

Another way of interpreting this is that people in an intense short age environment are forced to spend increasing amounts of official work and leisure time on household production.

output causes a fall in employment opportunities so $\frac{d\pi^2}{de_1} < 0$ is reduced. Since both π_1 and π_2 fall, total economy labor supply (π^2) drops as well.

The labor supply responses to greater excess demand in case three therefore are:

$$\text{Total economy } \frac{d\pi^2}{de_1} < 0$$

$$\text{First economy } \frac{d\pi_1^2}{de_1} < 0$$

$$\text{Second economy } \frac{d\pi_2^2}{de_1} < 0$$

In sum, the first economy labor response to intensified excess demand in consumption markets in the case of a quantity-constrained second economy is consistent with that hypothesized by Portes (1978b, 1979, forthcoming) whereas the actual economy labor supply reaction is contrary to that suggested in Nut (1986).

This discussion of labor supply responses demonstrates the value of incorporating the second economy in macroeconomic disequilibrium models of the CPR. Portes (1978b, 1979) and Portes and Winter (1980) exclude private activities from consideration. This limits their model's ability to analyze the differing responses in total labor supply (π^2) to excess demand. Their hypotheses concerning first economy labor supply behavior (π_1) are consistent with the results in two of the three cases examined, although not necessarily for the right reasons.

Nut (1986) makes a contribution to disequilibrium analysis by introducing a 'secondary market' and discussing its impact on labor responses in CPGs. But his model is financial in nature, highly aggregated, and focuses on private re trading of goods produced in the first economy. He does not examine illegal producers of consumer and producer commodities (SC and SF), second economy labor markets, and protection services markets. As a result, his assessment of second economy labor supply is too general to cover all the cases considered above. Hare (1987) develops a model of a CPG that explicitly includes private labor markets and analyzes the supply multiplier in an interesting manner. Nevertheless, he also does not examine fully the illegal activities of industry and government transactors and the regulatory role of control agency (CA). In consequence, his model is of limited utility in evaluating labor supply responses and the supply multiplier in a CPG with quantity-constrained first and second economy consumption markets.

C. Microeconomic Disequilibrium Econometric Models with a Private Sector

In addition to their uses in macroeconomic analysis, disequilibrium econometric models have been employed to examine microeconomic issues in consumption and labor markets in CPGs.⁴⁰ A number of these incorporate both first and second economy transactors and activities. In this

⁴⁰ Many of the macroeconomic disequilibrium econometric models in the consumption sphere are surveyed in the excellent paper of Charemza (Forthcoming).

section three microeconomic disequilibrium models of consumption with a private sector are reviewed. Starzynska (1986) on food markets in Poland; Alexeev (1987) on markets for meat and milk in the USSR; and Chareza, Grunicki, and Quandt (forthcoming) on the automobile market in Poland. Among the other related models that are not covered here are Pudkaminer (1988) on consumer markets in Poland and Alexeev (1988) on housing in the USSR.

Starzynska (1986) uses a disequilibrium indicators model to evaluate excess demand in official markets for seven categories of food in Poland. It is derived from or related to more aggregated models presented in Chareza (1981), Podkaminer (1982), Chareza and Gronicki (1988), and Welfe (forthcoming). The basic model of Starzynska contains demand and supply equations, the minimum condition, and a disequilibrium indicator. Reformulation results in linear demand equations for food commodity groups with observable independent variables, including the disequilibrium indicator.

Starzynska develops three variants of her model that reflect alternative formulations of the disequilibrium indicator. One of these indicators is based on the assumption that second economy (local fair) food markets generate equilibrium prices and that the difference between local fair and state price indices reflects disequilibrium in the official retail market. She reports, however, that the absence of appropriate price data prevent the estimation of a plausible demand equation. Instead, Starzynska defines two quantity based indicators that measure disequilibrium by comparing the ratio of actual food

supplies (S_t = either total market deliveries or state retail sales) and real income (D_t), that is $(\frac{S_t}{D_t})^*$, to an ideal standard that she claims reflects demand satisfaction $(\frac{S_t}{D_t}^*)^*$. Demand equations are estimated by ordinary least squares for seven food categories and then are used to evaluate excess demand in the official retail market for the period 1981-83. She finds that significant excess demand existed during the three years for meat, dairy products and eggs, and fish, but not for potatoes and corn products.

The paper of Starzynska (1986) represents a preliminary attempt to use a disequilibrium indicators econometric model in the microeconomic analysis of a CPV with a legal private sector. Due to problems in model specification, data availability, and estimation techniques it is not entirely successful by technical standards.

The Starzynska model also can be assessed relative to its coverage of the second economy system outlined in Part II of this paper. It includes three transactors (households (HO), first economy producers of consumer commodities (FC), and legal private producers of consumer commodities (LC)) and two markets (official retail markets (PRM) and legal private retail markets (LPM), which are called local fairs). Starzynska only briefly mentions illegal transactions, referring to 'the black market prices of meat'. It should be recognized, though, that legal private transactors and markets usually provide cover for illegal activities (Grossman (1977)), which could be substantial in scale. Given this, it might have been more illuminating if she had incorporated

in her model, or at least discussed, illegal producers of food commodities (SC) and the associated illegal retail market (SM).

The microeconomic disequilibrium model of Alexeev (1987) is used to examine some of the same commodity markets as Starzynska (1986). Meat and milk, but is based upon a different theoretical approach. In effect, it is an empirical application of the queuing model of Stahl and Alexeev (1985) that is discussed above (on pp. 79-82). An official retail market (FM) exists, which has prices fixed below equilibrium levels, excess demand, and rationing by queuing. Consumers (HO) can purchase goods in FM by paying the official price and queuing a fixed amount of time or in a legal private retail market (LM) by paying higher money prices. They also can re-sell goods obtained in FM to other households that have greater marginal valuations of time. The transactions made in price-flexible LM result in second economy prices that bring equilibrium to consumer markets. Demand curves for consumers can be derived by maximizing utility subject to a combined money and time budget constraint. Alexeev (1987, pp. 547-548) argues that since the full price paid by consumers for commodities is the parallel market equilibrium price, it should be used for estimating all-economy demand curves related to particular products. On the supply side, the model includes first economy and legal private producers of consumer commodities (MC and LC) but does not elaborate the behavioral patterns of these transactors in any detail. It does, however, discuss the features of first and second economy supply curves and their interaction with the full price demand curve.

In the empirical section of his paper Alexeev (1987) estimates demand curves for meat and milk in the USSR using data from the period 1958-1980. He makes the simplifying assumption that the second economy supply of meat and milk is primarily determined by administrative and quantity factors (e.g. availability of state inputs), so it can be treated as exogenous with respect to current private market prices. This allows the demand curve to be estimated through regression using a single equation with the dependent variable as collective farm market price and the independent variables as quantities consumed (represented by per capita production of meat or milk) and income (represented by average monthly wages).

The equation for meat is initially estimated by ordinary least squares and has a rather low Durbin-Watson statistic (0.97), which suggests serial correlation between independent variables. According to Intriligator (1978, p. 164), one treatment for this is to include other explanatory variables in the equation to be estimated. Alexeev chooses a second option of transforming the existing model through a differencing method (a two-step full-transform method developed by Praet and Winsten). The statistical properties of the estimated revised meat equation and the milk equation in original form estimated by ordinary least squares are assessed as satisfactory.

Alexeev uses the estimated equations to evaluate various aspects of the meat and milk markets in the USSR. He finds that considerable excess demand existed for both products in the time period under study. In the case of meat annual supply by the state in 1980 would have had to double to satisfy demand at prevailing subsidized official prices.

Other findings are that both the price and income elasticities of demand for meat and milk are substantially higher than those in the U.S. For example, income elasticity for meat is 2.9 in the USSR and 0.35 in the U.S. Although it is not the case that meat is a luxury good in the Soviet Union, the differences between these elasticities are considerable and raise questions about the reliability of the Soviet estimates. Alexeev (1987, p. 554) recognizes this and cautions that the numbers presented in his paper 'must, of course, be treated as crude approximations'. Despite these difficulties, the article by Alexeev presents an interesting, original microeconomic application of disequilibrium econometrics to the study of the second economy in a CPE.

The third disequilibrium investigation to be reviewed is of the Polish automobile market by Chareza, Gronicki, and Quandt (Forthcoming). They present a model that offers the consumer the options of queuing for a durable good in an official domestic currency retail market characterized by excess demand or of purchasing the good without waiting in either an official hard currency market or a private domestic currency market. The analytical focus is on one transactor, households (HO), and on the official domestic and hard currency retail markets (HM), the legal private retail market (LPM), and the illegal foreign currency exchange market (HFM). In contrast, there is minimal description or analysis of industry transactors (SC and HC) and government agencies involved in automobile supply. Car supply is exogenously determined by mysterious powers and has the characteristic that it is always less than demand in the official retail market.

The authors note that there is a legal freeprice private market for second hand automobiles in Poland. This means that the illegal retail market (SM) is limited in scale. Nevertheless illegal transactions do occur, such as immediately re-selling for a profit cars acquired through queuing in the official retail market and falsely reporting a low sales price of a car in order to minimize taxes (Starzec 1983). Thus it might be appropriate to view the legal private retail market (LPM) in this model as subsuming the illegal retail market (SM). One unique feature of this disequilibrium econometric model is its examination of an illegal market for foreign currency exchange (HFM). A sophisticated utility maximizing model of the consumer in a queuing situation is presented that has features similar to those of Lindsay and Feigenbaum (1984) and Katz and Qian (1984, 1987 (see discussion above)). This generates equations defining excess demand for cars in the official retail market and mean waiting time in the queue. Turning to the modelling of the three different automobile markets, the authors indicate that data constraints prohibit the full specification of demand and supply functions. Instead they are forced to specify a three equation model containing partially reduced structural equations, all expressed in real terms. For the domestic currency official retail market a structural equation depicts demand as a function of four variables: personal income; the expected increase in the price of dollars on the black market; a dummy variable reflecting temporary bouts of 'success illusion' concerning the economy; and a relative price (the legal private retail market vs. official retail market) effect. The official hard currency car market is represented by

a reduced form equation with the dependent variable as the implicit domestic currency price of a car (i.e. (the official dollar price) \times (the black market dollar exchange rate)). The independent variables are the excess demand in the official retail market and the domestic currency price of a new car in the official retail market. Their respective parameters measure spillover and substitution effects. The third equation for the legal private market (LPM), also in partially reduced form, defines the market clearing price of a second hand car as a function of: the previous period's car price; the increase in the black market dollar exchange rate from the past period; and the domestic currency price of a new car in the official retail market.

Considerable ingenuity is used in selecting or defining measurable variables and gathering the necessary data from a variety of Polish and Western sources. Maximum likelihood estimation techniques are employed to estimate the parameters of the equations discussed above, various modifications of them, and a condensed model. The best of the five estimated models are then utilized to predict excess demand and mean waiting time in the queue in the official retail market by quarter during 1974-82. This shows, unsurprisingly, that both rose to peaks in the years 1981-82. Calculations also are made of the price and income elasticities of demand for new cars.

D. Charemza's Deregulating Econometric Model of the Second Economy
in the Consumption Sphere of a CPM

Charemza (Forthcoming) in his study of consumption in Poland has developed a macroeconomic disequilibrium econometric model of a CPM with a second economy that deserves careful attention. His main objective is to estimate excess consumer demand in the official retail market by analyzing spillover effects in the second economy markets. With respect to transactors, he focuses on households (HO), which are divided into two groups depending upon primary source of income: first economy or second economy. The markets analyzed are the official retail market (FIM), a combined legal private and illegal retail market (LPM and SHM), and the illegal foreign currency exchange market (HNM). In the official retail market prices are fixed and exogenously determined by central authorities, whereas prices in SHM and HNM are flexible and achieve market clearing levels. The model includes supply functions but makes no attempt to describe industry transactors such as first economy producers of consumer commodities (FC), legal private producers of consumer commodities (LC), illegal producers of consumer commodities (SC), first economy producers of producer commodities (FP) and illegal producers of producer commodities (SP). Furthermore, the government transactors (central economic authorities (CE), central supply agencies (CS), control agencies (CA), political authorities (PA)) are lumped together and treated in a cursory manner.

Charemza specifies demand equations for the official retail market (FIM) and the illegal retail market (SHM). The latter shows second economy demand as a function of: national demand of second economy

households; excess demand in the official retail market (the spillover effect); and prices in the illegal retail market and the official retail market. He generates models (denoted A1, A2 and A3) of consumption market behavior by specifying three different second economy supply functions. These are then reformulated so that second economy price (P_{2t}) becomes the dependent variable. The independent variables are: quantity of transactions in the second economy retail market; price in the official retail market (lagged one period in A2); and a consumption supply adjustment mechanism (respectively, quantity autoregressive, price autoregressive, and household expectations of quantity constraints in the official retail market). One underlying assumption of these models is that the government authorities do not restrict the expansion of the second economy. Since this is not always plausible, he formulates two other models (B1, B2) based on the assumption that supply can be exogenously limited. These reduce to the first economy demand equation and a second economy price equation. Further manipulations of equations in the five models ensure that all independent variables are observable.

Charemza is creative not only in his formulation of the models, but also in the development of his data base. In order to estimate the various equations he needs information on second economy prices, quantities transacted, money stocks, and personal incomes. Even in Poland these data are not included in statistical yearbooks. But by utilizing a variety of sources and making some reasonable assumptions Charemza generates the necessary series. He acknowledges that there is uncertainty associated with this work but makes the good point that the

same is true of official consumption data, which measure only transactions in the official retail market. He argues that:

'If the underground economy exists, as it clearly does in Poland, then the official data are biased when utilized in the evaluation of total (official and unreported) consumption. Hence, analysis of consumption in CPBs face a dilemma: to use the abundant data on the "first" economy that are biased due to their neglect of the "second" economy, or to employ the full set of consumption data, which is subject to greater measurement error but is less biased. I would suggest the latter course. It is better to attempt to include underground transactions in consumption analysis, even if some of the data are inaccurate, than to pretend that the second economy does not exist'.

The models are estimated using annual data for Poland for the period 1956-66. Since the equations are non-linear functions, special estimation techniques need to be used. Models A1, A2, and A3 are estimated by a full-information maximum likelihood conjugate gradient method, which Charemza calls the Davidon-Fletcher-Powell optimization algorithm, and B1 and B2 by a least squares method.⁴¹ During estimation no restriction is imposed on the sign of excess demand in the official retail market, thus paying heed to the injunctions of Portes (Forthcoming) not to pre-judge the issue of disequilibrium in CPE consumption markets.

⁴¹ The Davidon-Fletcher-Powell algorithm, mentioned in both Charemza (Forthcoming) and Quandt (Forthcoming), was developed from the papers of R. Fletcher and M.J.D. Powell 'Function minimization by conjugate gradients', and W.C. Davidon 'Variable metric method for minimization', cited in Goldfeld and Quandt (1972, pg. 13). Conjugate gradient methods are discussed in Chapter 1 of Goldfeld and Quandt (1972) and non-linear least squares methods in Chapter 2.

The estimated models are then used to evaluate excess demand in the official retail market in Poland for the years 1961-62. Upper and lower estimate variants are made to take into account the possibility that the parameter in the first economy demand equation might have been overestimated due to the overlap of demand functions of the official retail market ($FIM + SII$) and the total consumption market ($FIM + SII + SHI$). The results from models A1, A2, A3, and B2 indicate that excess demand grew continuously at least from 1970 to a peak in 1980, fell for several years, and reached another high point in 1985. It should be noted that

Chareaza's findings of chronic excess demand in the years 1970-75 are inconsistent with the estimates of Portes and Winter (1980) concerning the Polish consumption market. The story generated by Model B1 is slightly different in that the phenomenon of uninterrupted excess demand commenced in 1974 and the peaks were in 1981 and 1986. Chareaza also carries out assessments of the capabilities of the various models in forecasting second economy demand and prices and first economy excess demand for the years 1984-86.

It is clear that Chareaza's study represents an important step forward in macroeconomic disequilibrium econometric modelling of the second economy. Numerous important contributions are made in model specification, data development, estimation, and analysis of excess demand in Poland. Nevertheless, his work has some drawbacks: unclear treatment of the labor market; households receive second economy income from illegal producers of consumer commodities (SC) and illegal producers of producer commodities (SP), but not from other transactors as shown in Diagram 2; an assumption evidently required by

identification conditions of the model); first economy households have no ex ante demand for second economy goods despite chronic disequilibrium in the official retail market; neglect of industry and government transactors and markets; and no discussion of the role of bribes in facilitating second economy operations.

V. The Second Economy in the Shortage Model

The shortage model developed by Janos Korosi offers an alternative approach to the analysis of disequilibrium and shortage phenomena in CPSS. As indicated in Part II of this paper, there has been substantial development of this model since it was initially presented in Korosi (1980). Given the close connections between imbalances in official markets, deficits of commodities, and the second economy, it might be expected that legal and illegal private activities have been carefully examined using the shortage model. The objectives of this part of the paper are to review the actual coverage of the second economy system in existing shortage model studies (Section A) and assess the model's potential as a tool for the analysis of the second economy in CPSS (Section B).⁴²

42 Davis (Forthcoming (a)) is devoted to the analysis of the actual and potential treatment of the second economy in the shortage model. In order not to replicate coverage, the survey of the shortage model in Part V of this paper is less detailed than the equivalent review of disequilibrium models presented in Part IV.

A. The Initial Shortage Model and the Second Economy

The theoretical model of Kornai describes a CPE in which there are pervasive and chronic shortages of goods and services in retail and producer goods markets. Given these circumstances and the obvious linkage between greater demand than supply in official retail markets (LEM and STM) it might be expected that the private sector would be an integral component of the shortage model. In fact, however, shortage modelers of CPEs have neglected the second economy system.

In Economics of Shortage Kornai makes numerous side comments on the black market, the second economy, and corruption but consciously avoids a thorough examination of these phenomena. In his introduction Kornai (1980, p. 14) writes:

"We shall only touch upon, in a few places of the book ... the sphere that is called the "second economy" or "informal sector"."

The second economy is briefly discussed in subsequent articles such as Kornai (1983; 1986b, pp. 1704-1709). But he has made no attempt to model in a formal manner the private sector in a shortage economy.

Some other analysts of the second economy in CPEs have employed concepts similar to those presented in Kornai (1980) or explicitly have used elements of the shortage model.⁴³ Although the article of Gabor (1979) pre-dates the Economics of Shortage, he argues that the chronic

shortage of labor in the socialist economy helps explain the development of the second economy. Gabor and Galasi (1981), Galasi (1985) and Brus and Laski (1985) utilize some of Kornai's terminology and ideas in their analyses of the second economy.

B. Potential Applications of the Shortage Model in Second Economy Analysis

Despite this modest analytical record, the shortage theory of Kornai offers considerable potential for the modelling of the second economy system and its transactions. This is due to three factors. First, the primary objective of the model is to analyze the causes of and behavioral responses to shortages of labor, goods, and services. As indicated above, the second economy contributes to deficits through its thefts or diversions of labor time and commodities and responds to spillover demand from official markets in disequilibrium. Second, Kornai has developed detailed micro-models of households and consumer goods enterprises, both of which play important roles in the second economy. Third, the shortage model emphasizes the importance of quantity processes and non-price control in the CPE. Diagram 1 shows that physical flows of goods and services are of considerable importance in the second economy system. Given this, the remainder of the section offers several suggestions concerning how the shortage model could be used to analyze the second economy. Attention is focussed on the issues of government control, consumer behavior, labor markets, and enterprise production and trade.

⁴³ This paper only considers English language material. It appears from Kornai (1966b, pg. 170b) and private discussions that there are more detailed shortage model studies of the second economy in Hungarian. An attempt will be made to assess any such contributions in Davis (Forthcoming (a)).

David (forthcoming (b)) shows how the original shortage model can be adapted to portray the output, production, and input behavior of service producing institutions, in this case medical facilities, in a CPB. The same approach could be used to model the government transactors: political authorities (PA), control agencies (CA) and central economic authorities (CEA). These transactors produce regulatory and illegal services and supply them to subordinate 'buyers'. In fact, Kornai (1980) already provides some insights into the behavior of planners in a shortage economy. The fourth government transactor is central supply agencies (CS). The operation of a 'central material rationing authority' also is covered in Kornai (1980, pp. 104-107). In all these cases, adaptations would have to be made to Kornai's formulations to portray more clearly the provision of protection services, false plans, and unofficial supplies.

The priorities of the political leadership (PA) exert a significant influence on general developments in the socialist economy and on the intensity of shortages, hardness of budget constraints, and other operating conditions in specific sectors (Davis (1988, forthcoming (b))). It is likely that in low priority sectors, such as consumption, there are the greatest deviations of leadership and consumer preferences, the most intense shortages of goods and services, and the most pervasive second economy activity. Kornai's model could be used to analyze this relationship between priority, shortage, and the second economy.

Concepts elaborated in Kornai (1980) about superior subordinate relations in the production sphere of the socialist economy and 'control

by norms' could be adapted to explain the government's regulatory behavior in the second economy. Galan (1985) and others have argued that the state is aware of the activities of the private sector and has objectives concerning its contribution to the first economy and degree of development. In Kornai's terminology, the government establishes norms of behavior and 'tolerance limits' with respect to the second economy. Interventions are made to liberalize or tighten operating conditions when these limits are violated. It would be of interest to know more about the determinants of these tolerance limits, which vary over time (e.g. Brezhnev vs. Gorbachev era in the USSR) and country (e.g. Poland vs. Czechoslovakia). The study of 'control by norms' could help to clarify the extent to which second economy markets in CPBs are quantity-constrained, an issue raised above on pp. 94-96.

A final issue of relevance to the central authorities is corruption. Kornai argues that bribery is a standard response of buyers in their effort to win over the supplier in a seller's market. Bribes can be made in physical form (presents, favors) or in monetary form (cash, hard-currency coupons). As a rule, these bribes are payments for the provision of tangible goods (e.g. diversion of first economy fuel to second economy producers of consumer commodities (SC) or services (e.g. protection by control agencies (CA)). These transactions occur in various goods and protection markets. In other words, the shortage model could be used to explain the origins and dynamics of many of the quantity flows (protection services, bribes in kind) and financial flows (bribes in cash) shown in Diagrams 1 and 2.

Although much attention has been devoted to modeling households in CPS, it should be recognized that often the portrayal is excessively simplified. Households usually are treated as homogeneous in their behavior with respect to labor and retail markets. This is a characteristic of Kornai (1980) as well as of most disequilibrium and second economy models.¹⁴ In reality, however, households are different and can be divided into at least three groups: elite, ordinary, and disadvantaged. Their varying behavior in the second economy could be depicted using the shortage modeling approach.

The first group is made up of the party and state elite (transactor PA). Members usually do not provide labor services directly to illegal producers of consumer commodities (SC) or illegal producers of producer commodities (SP) and many do not receive illegal income. Despite this they live quite well. This is due to their high official wages and the preferential distribution to them through special rationing schemes of consumer goods and services. In most socialist countries the elite are served in closed retail shops and medical facilities and obtain superior flats and dachas from reserved stocks (Matthews (1978)). Given these privileges, the elite makes little use of either the official retail market (FIM) or private ones (the legal private retail market (LPM) and the illegal retail market (SIM)). The elite is largely unaffected by the price rises or shortages in the official retail market that its policies generate.

¹⁴ It should be noted that some analysts, such as Ilure (1987) and Chereza (forthcoming), do distinguish between first and second economy households.

Two elite sub-groups should be recognized. First, some members of the elite are corrupt, receive substantial bribes in cash and kind, and utilize the second economy retail market. This can be seen from the case histories of recently purged high level officials in Moscow, Uzbekistan, Azerbaijan, Armenia, Kazakhstan, and Georgia. Second, nomenklatura privileges are highly differentiated. It is possible that numerous apparently high level officials do not receive significant rationing advantages with respect to consumer goods, but are too worried about the risks and consequences of detection by control agencies (CA) to participate in illegal second economy activities. As a result, these people may have lower standards of living than those lower than them in the official hierarchy who are not so constrained.

The majority of the population belongs to the second group of households. They experience difficulties obtaining goods and services in the official retail market (FIM), are not assisted by special rationing schemes, and are confronted with the choice of queuing or using the more expensive second economy retail markets (LNM and SIM). In order to acquire the income necessary to finance second economy transactions they provide labor services to illegal producers of consumer and producer commodities (SC and SP). Members of this group actively participate as buyers in the legal private retail market (LPM) and the illegal retail market (SIM). In addition, they engage in the second economy barter transactions that Kornai (1980, pg. 77) calls the 'chain of mutual services'. They also bribe party and state officials who manage rationing schemes in the official retail market for commodities such as housing and cars in order to move to the head of

values. One final characteristic of those households is that they save a significant share of current income. They are responsible for the excess saving, or 'inflationary overhang', in the socialist economy discussed by Nuti (1986), Herer and Sadowska (1988) and others. Due to the asset position of these households, their behavior as buyers exhibits a low degree of responsiveness to moderate changes in state prices in the official retail market. Given this, it can be argued that they have relatively soft budget constraints.

The third set of households is comprised of the disadvantaged: the physically disabled, mentally ill, elderly, and the unskilled. These people receive low fixed incomes (wages, social security payments) that place them in or near poverty (see Matthews (1986)). For a variety of reasons they do not have the ability to supplement their income by providing labor services to second economy producers of consumer and producer commodities. In consequence, they face hard budget constraints that must confine their shopping to the official retail market.

Kornai's concept of 'control by norms' can be related to household behavior in the second economy. Evidence from socialist countries indicates that the public also has certain 'tolerance limits' concerning illegal practices and black market prices (see the discussions above on pp. 43 and 100). If these norms are violated, many consumers cease participating in that segment of the illegal retail market (IRM) and become so disgruntled that the probability of denunciation to control units (CA) of the seller of illegal goods and services rises significantly. Thus the operation of illegal producers of consumer commodities (SC) and the illegal retail market (IRM) are controlled by

both the norms of the political authorities (PA) and households (HO).

The labor market in a CPE as it relates to the second economy can be analyzed in an interesting manner through the use of the shortage model. Kornai (1980, p. 394) believes that aggregate demand and supply of labor in a socialist economy are quantity processes that generate and reproduce labor shortages. The widespread shortages in official labor markets cause hoarding of labor by state institutions, on-the-job underemployment, and slack discipline (see also Gabor (1979) and Gabor and Galai (1981)). The shortages in the official retail market (IRM) result in spillover demand in the illegal retail market (IRM) and therefore in greater derived demand for labor services in the labor markets of illegal producers of consumer commodities (SCIM) and illegal producers of producer commodities (SPIM). The high second economy wages attract the services of employed members of first economy institutions who are able to steal labor time due to ineffectual managerial control.⁴⁵ The unofficial siphoning of labor from the first to the second economy results in less labor being available for official production than managers anticipated, holds back the output of consumer goods, and increases the 'hunger' for labor in the economy.

⁴⁵ It appears that the shortage model assessment of the labor supply response discussed above on pp. 85-97 would be that an intensification of shortage ('excess demand') (e.g.) in the official retail market results in an increase in p_2 , a decrease in p_1 , and probably no change in p_3 .

Kornai has elaborated a relatively rich theoretical model of the enterprise in the socialist shortage economy. Research by Davis (1988, forthcoming (b)) indicates that most of its hypotheses concerning output, production, and input operations of the socialist firm are consistent with reality, although modifications do have to be made to take into account the impact of sectoral priority. The shortage model could be adapted to portray in more detail the effects of the second economy on the behavior of legal transactors (first economy producers of consumer commodities (FC), legal private producers of consumer commodities (LC), first economy producers of producer commodities (PP), illegal producers of consumer and producer commodities (SC and SP), and their interactions in producer goods markets (such as the capital and intermediate goods market of illegal producers of producer commodities (SPCM)).

One issue in the production sphere that could be examined is the nature of markets for output. Kornai (1980) claims that state firms in a shortage economy operate in sellers' markets, such as the official retail market (RM), which is a circumstance that contributes to their low quality of products, quantity drive, riskaverse managerial behavior, and reluctance to engage in technological innovation. It would be of interest to assess the market power of state firms in illegal producer goods markets (e.g. the capital and intermediate goods market of illegal producers of producer goods (SPCM) and of illegal transactors (SC and SP) in illegal markets (the illegal retail market (SRM) and the capital and intermediate goods market of illegal producers of consumer commodities (SCM)).

One possible hypothesis is that second economy markets are more competitive and therefore produce greater equality in market power between buyer and seller. Furthermore, budget constraints in the second economy are supposed to be 'hard'. This implies that the private firm would offer better products and services to customers and engage in more related technological innovation than would a state enterprise. Such outcomes would contradict the argument of Galaz (1985) that illegal production is associated with stagnant productivity. An alternative hypothesis would be that the quantity constraints imposed on the second economy as a result of government and household control by norms and regulation by control agencies (CA) distort apparently competitive markets in a manner that shifts power in favor of the supplier. This would result in a behavioral pattern of the second economy firm similar to that of its first economy equivalent.

The shortage model could be used as well to analyze other quantity processes in the production sphere. One of these would be the provision of bribes in kind from subordinate units to central supply agencies (CS), central economic authorities (CE), control agencies (CA), and political authorities (PA). Another topic that could be examined with the help of the shortage model is inter firm barter of goods and services in the second economy. Kornai (1980) contains much material about barter allocation mechanisms that could be applied to the analysis of this phenomenon.

Finally, Kornai's concept of 'siphoning' could be employed to describe the effect of theft of materials from first economy producers of consumer commodities (FC) and first economy producers of producer commodities (FP) to supply the second economy. In its traditional usage, siphoning refers to the transfer of resources from institutions (firms, consumers) with hard budget constraints to those with soft ones. In a second economy context, however, the reverse appears to be true. That is, resources flow to hard budget constraint private firms from soft budget state enterprises. It would be interesting to develop a theoretical explanation for this. In any event, this siphoning through theft and embezzlement, which appears to occur on a large scale, has substantial adverse consequences for the economy. It diverts output from the official retail market and thereby intensifies shortages and raises queuing costs of consumers. Siphoning also draws down the inventories of firms in an unplanned manner, which contributes to production bottlenecks and to the growth of firms' already high demands for inputs. This intensifies shortages in producer goods markets in the socialist economy.

IV. Conclusions

The objective of this paper is to assess the treatment of the second economy in disequilibrium and shortage models of centrally planned economies. In order to survey any diverse set of models in a coherent manner it is necessary to utilize a comparative methodology.

The one adopted is based upon systems analysis. An attempt is made to define the second economy system, to describe it in detail, and to evaluate the contributions made by the disequilibrium and shortage models to the analysis of this system.

A review of the literature indicates that there are varying, and sometimes conflicting, definitions of the second economy in CPEs. It appears that more conceptual work is needed on this issue. For the purposes of this paper, the second economy is defined as a system comprised of all transactors and markets involved in activities of production and exchange which have the characteristics of being for private gain and/or illegal.

The description of the second economy is a vital step in systems analysis and contributes to the assessment of disequilibrium and shortage model coverage. Since a suitable, detailed description is unavailable elsewhere, an original one is developed on the basis of national accounting concepts. Section II.B identifies the ten household, industry, and government agency transactors in the second economy system and describes their activities of production, provision of goods and services, generation of income, acquisition of inputs, and expenditure. These transactors are involved in four types of exchanges

(money-commodity, commodity-money, favors-favors) in a variety of markets (labor, consumer goods, producer goods, foreign currency exchange, regulatory services, and protection services). Section II.C argues that it is helpful for conceptual purposes to depict separately quantity and financial transactions and flows in the second economy system. This is done in Diagrams 1 and 2, which provide the framework for the subsequent comparison of models.

Developments in the second economy have been closely linked with disequilibria in markets and shortages of commodities, and together they have been of considerable importance, throughout the histories of CPEs (Section III.A). Given this, it would appear sensible to incorporate private sector activity, market imbalances, and shortage-related behavior of transactors into models of CPEs. But until recently, most theoretical and econometric models ignored these phenomena. Section II.B shows that advances in economic theory, econometrics, databases, and computational capabilities provided the foundation for the emergence of new approaches to modelling CPEs. Over the past decade many theoretical and empirical disequilibrium and shortage models have been produced (Section III.C). This survey is concerned with evaluating the comprehensiveness of their coverage of the second economy system and the related analytical contributions of these models.

Part IV surveys several groups of disequilibrium models. The first is comprised of theoretical equilibrium models with imbalances in official markets and private sector equilibrating processes. Three of the models surveyed in Section IV.A (Stahl and Alex., v (1985), Wellisz and Findlay (1986), and Katz and Owen (1987)) focus on consumption

markets. They examine the behavior of households, firms, and planners in an environment characterized by excess demand in official retail markets and demand responsiveness in legal private and illegal retail markets. The studies show that the CPEs under investigation can attain equilibrium states as the result of second economy adjustment, but differ in their assessments of the Pareto characteristics of the equilibria. The models of Ericson (1983, 1984) are unique in their concentration on second economy enterprise behavior in producer goods market. One important analytical result is that illegal inter-firm trade generates a Pareto-improvement equilibrium.

The original disequilibrium macroeconomic econometric models of Portes and co-authors make numerous contributions to the study of CPEs, but they neglect the second economy system. Section IV.B argues that this limits the utility of the models in various ways and raises questions concerning their empirical findings and general applicability. First, it is difficult to understand the functioning of consumption markets in countries such as Poland, Hungary, the USSR, or China without considering legal and illegal private retail markets and the illegal inter-firm markets for the capital and intermediate goods that support the production of consumer commodities. Second, the assessment of excess demand in official retail markets is problematic if no attempt is made to examine simultaneously the roles of private markets in coping with spillover demand and bringing about equilibrium in the total consumption market. Third, the labor supply responses of households to excess demand in official consumer goods markets are more complex than implied by Portes and are heavily influenced by the second economy. A

rise in excess demand (e) in official retail markets can cause an increase, no change, or a decrease in total labor supply (9). The variation in responses is explained by differing assumptions concerning the detailed operations of the second economy.

This paper only briefly discusses the macroeconomic, non-econometric models of Brus and Laski (1985), Nuti (1986), and Herer and Sadowski (1988), which assess the relationship between repressed inflation in official retail markets and second economy activities. Their focus is on financial issues (money supply, demand for money, real money balances, inflationary overhang) rather than quantity flows and transactions, and on household behavior. These studies reach different conclusions about the equilibrating role of the second economy and the effectiveness of state-induced price rises in clearing official retail markets.

The three microeconomic disequilibrium econometric models reviewed in Section IV.C (Starzynska (1986), Alexeev (1987), Charemza, Gronicki and Quandt (Forthcoming) and two others not examined in detail (Podkaminer (1988) and Alexeev (1988)) analyze consumption markets for food, consumer durables, services, and housing. In general they argue that chronic excess demand exists in official retail markets, but that the second economy alleviates some of the adverse consequences by absorbing spillover demand.

Charemza's macroeconomic disequilibrium econometric model of the consumption sphere in Poland is the final one surveyed in Part IV. It examines household behavior in a CPI that has an official retail market, private retail market, and illegal foreign currency exchange market.

Its main methodological finding is that excess demand in official markets can be measured indirectly through analysis of second economy markets. One interesting empirical conclusion is that excess demand, with varying degrees of intensity, existed in Polish consumption markets from the early 1970s through the mid 1980s.

The review of disequilibrium models indicates that substantial progress has been made in recent years in the analysis of the second economy system. Nevertheless, significant gaps in coverage exist and numerous important issues have been inadequately examined. In the future, research could be usefully devoted to at least five topics: labor supply responses of households in a situation of excess demand in official retail and labor markets and of second economy employment and consumption opportunities; the behavior of industrial enterprises in a suppressed inflation environment with supplemental illegal markets for outputs and inputs; the effects of quantity constraints in second economy markets; the analysis of regulatory and protection services (bribes) markets and the role played by government agencies in controlling the second economy; and the impact of the second economy on monetary and financial policies and processes, at both macro and micro levels, in CPIs.

The shortage model has a theoretical foundation that is different from those of the disequilibrium models and it places more emphasis on the analysis of quantity (non-price) processes, transactions, and control mechanisms. Given the close links between shortages and the second economy one might expect that shortage model studies would have adequately covered at least the transactors, markets and quantity flows

described in Diagram 1. However, Section V.A indicates that little work on the second economy system has been carried out to date by Janos Kornai or other shortage modellers. It is argued in Section V.B, however, that the shortage model could be used to analyze a variety of second economy topics. Among these are: the behavior of government service producing transactors in a CPE with a second economy; the relationship between priorities, shortages, and the second economy; government 'control by norms' of the private sector; the behavior of different household groups (elite, average, disadvantaged) in consumption markets with varying rationing schemes and second economy employment and consumption opportunities; the influence of informal norms of households concerning free-market prices on the operations of the second economy; household labor supply responses in a chronic shortage environment with first and second economy labor markets; the production and trade behavior of an industrial enterprise in a socialist shortage economy with illegal output and input markets; the impact of bribes and illegal barter on operations in the production sphere of a shortage economy; and the causes and consequences of illegal siphoning of labor and commodities from the first economy.

In conclusion, this survey indicates that up to now disequilibrium models of CPEs have been superior to shortage models with respect to coverage of the second economy system, rigor in formulation, sophistication of econometric estimation, and justification of empirical findings. Despite this current imbalance, these modelling approaches can be viewed as complementary and offer differing advantages. Judging from the research record, the disequilibrium models appear to be best

suitied to the investigation of household behavior, consumption markets, and the financial flows and transactions shown in Diagram 2. In contrast, the shortage model appears to have strengths in the description and evaluation of: the behavior of industry and government transactors; producer goods, labor, and protection services markets; and the quantity flows and exchanges shown in Diagram 1. Both disequilibrium and shortage models have considerable potential as tools for the analysis of legal and illegal private activities. Given the historical linkage between disequilibria in markets, labor and commodity shortages, and second economy phenomena plus the increasing power of the private sector in reformed or reforming CPEs, it is clear that the further development of disequilibrium and shortage models that incorporate the second economy will facilitate both the understanding of the current situation and the forecasting of future trends in socialist economies.

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